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October 2015

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by Scott Weidensaul

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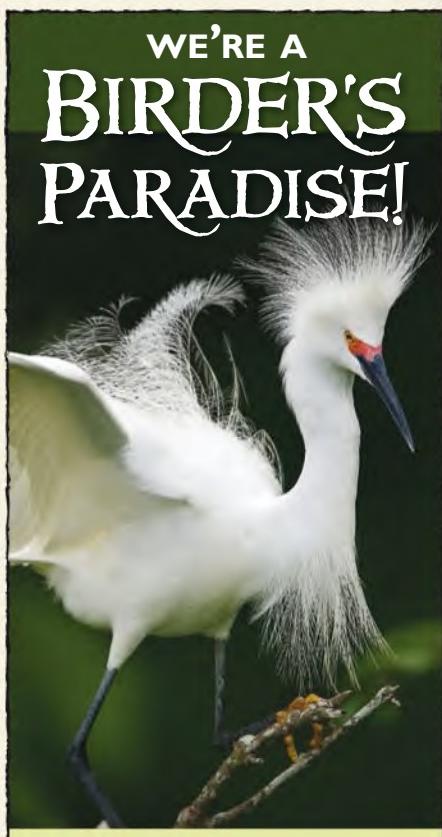
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Emperor Penguin by Doug Allan/NPL/Minden Pictures

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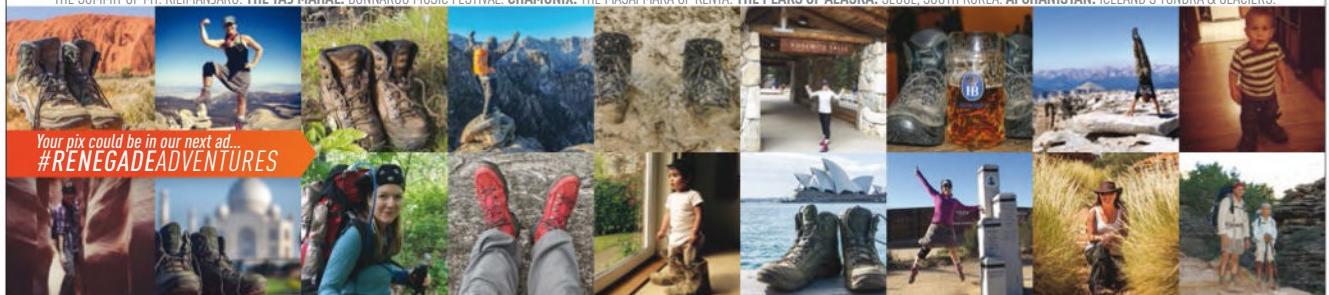
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How well do you know the magnificent bird on our cover, Snowy Owl?

According to best-selling author and Project SNOWstorm co-founder Scott Weidensaul, assumptions about almost every aspect of the owl's life — its breeding and wintering ecology, the driving forces behind its dramatic irruptions, how to distinguish birds of different ages and sexes, even how many owls there are — have shifted over the past decade or so. Weidensaul explains how much in his article "Snowy Enigma," on page 18. It's an exclusive excerpt from his much-anticipated new book, *Peterson Reference Guide to Owls of North America and the Caribbean*, due out in October.

And just how familiar are you with the familiar Turkey Vulture? For years now, ornithologist and retired radiologist C. Stuart Houston has been applying wing-tags and the occasional satellite transmitter to vultures living in Saskatchewan and adjacent Alberta, at the northern limits of the species' range. As you can read in his fascinating article ("Northern Novelty," page 32), not only are his Canadian birds breeding farther north than any other North American vultures, and not only are they migrating farther south than most, but they're also choosing to lay their eggs in locations that will change forever the way you look at old farm houses.

And what about the world's petrels, shearwaters, albatrosses, and other seabirds? If you're like me, you probably know less about them than Snowy Owls and Turkey Vultures but relish the thought that they're out there, waddling on distant beaches, skimming waves a boatride away, plunge diving like arrows just over the horizon. We can learn more about them tomorrow, I've always told myself.

But can we? In "Birding Briefs," we report something truly shocking — that the seabird populations of today are only a fraction of what they were decades ago. Birds disappearing before we can get to know them, it's one of the worst things I can imagine.



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Newsstand National Publisher Services

Subscriptions (877) 252-8141

Foreign Subscriptions (903) 636-1121

Corporate Headquarters

Madavor Media, LLC

25 Braintree Hill Office Park | Suite 404

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SUBSCRIPTIONS: 1 Year (6 Issues) US \$26.95, Canada \$32.95, Foreign: \$34.95

POSTMASTER: Send address changes to BirdWatching Magazine, P.O. Box 4300, Big Sandy, TX 75755-4300. Subscribers allow 4-6 weeks for change of address to become effective. Subscriptions ordered are noncancelable and nonrefundable unless otherwise promoted. Return postage must accompany all manuscripts, drawings and photographs submitted if they are to be returned, and no responsibility can be assumed for unsolicited materials. All rights in letters sent to BirdWatching Magazine will be treated as unconditionally assigned for publication and copyright purposes and as subject to unrestricted right to edit and to comment editorially. Requests for permission to reprint should be sent to the Permissions and Reprints Department. The title Birder's World DBA BirdWatching Magazine is registered in the U.S. Patent and Trademark Office. Contents copyright © 2015 by Madavor Media, LLC. All rights reserved. Nothing can be reprinted in whole or in part without permission from the publisher. Printed in the U.S.A.

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Brent Stephenson/NPL/Minden Pictures

ONCE ABUNDANT: Sooty Terns take flight over Maupihaa Atoll, in French Polynesia. The population is one of five that has shrunk dramatically since 1950.

Silence of the seabirds

Global seabird populations declined 70 percent throughout the modern industrial era

Pelagic birding trips and guides may be more sophisticated than ever, and birders on boats may be recording new species every year, but the sad truth is that the number of seabirds living today is only a fraction of what existed decades ago.

According to research published online early this summer, the world's monitored seabird populations declined 70 percent between 1950 and 2010. The drop is equivalent to a loss of about 230 million birds.

Researchers Michelle Paleczny, Edd Hammill, and others analyzed a database containing population sizes for about 19 percent of the world's seabirds and 13 of the 14 seabird families.

Of them, three increased, while the other 10 decreased, some dramatically. Procellariidae (petrels and shearwaters) and Phalacrocoracidae (cormorants) fell by over 70 percent, while both Sternidae (terns) and Fregatidae (frigatebirds) decreased by more than 80 percent.

A substantial proportion of the overall loss was due to large declines in the five most abundant populations, all of which were in the Southern Hemisphere. In 1950, they accounted for over 30 percent of seabirds sampled, but by 2010 each had been reduced to less than 5 percent of its initial size.

Introduced species, entanglement in fishing gear, overfishing, climate change, plastic and oil pollution, habitat disturbance, development, and direct exploitation

were among the factors that likely caused the declines, write the researchers.

The results demonstrate a need for increased international conservation. The removal of cats and rats from small islands has been shown to increase local seabird numbers, write the researchers. "However, undertaking conservation actions for pan-global populations, such as reducing oceanic pollution or lowering fishing pressure, will be considerably more challenging."



YOUR QUESTIONS
ANSWERED BY
BIRD BANDER
JULIE CRAVES

ALast fall, the nectar in my hummingbird feeders would disappear overnight. Do hummingbirds feed at night? — Sarah Muller, Sierra Vista, Arizona

Hummingbirds would not come to your feeders at night. Other nectar-loving, flying animals are likely making nocturnal visits to your feeders: bats. Two species in your area, endangered lesser long-nosed bat and Mexican long-tongued bat, are known to use hummingbird feeders. Both are important pollinators of cacti and agaves.

ADo any birds drink blood? — Lorrie Gregory, Minneapolis, Minnesota

Probably the most blood-dependent bird is a subspecies of Sharp-beaked Ground-Finch, which is found on two of the Galápagos Islands. Known as the Vampire Finch, it feeds on the blood of seabirds by pecking at the base of their feathers, creating a bleeding wound.

Vampire Finches do not consume blood exclusively. They also eat cactus nectar and pulp and the contents of bird eggs that they break open. Galápagos Mockingbirds have also been observed drinking blood from wounded birds and animals.

(continued on page 10)

Julie Craves is supervisor of avian research at the Rouge River Bird Observatory at the University of Michigan Dearborn and a research associate at the university's Environmental Interpretive Center.

EYE ON CONSERVATION



Andy Bunting

SWIFT, NOISY: Santa Marta Parakeet is one of 19 endemic bird species found in Colombia's El Dorado Reserve.

For an endangered parakeet, a jewel

Endangered Santa Marta Parakeet can be found in only one place on Earth — the ancient and isolated massif known as the Sierra Nevada de Santa Marta, in extreme northern Colombia — and is thought to be declining. Now, thanks to the conservation of a 148-acre tract known as La Cumbre Property, the bird will be better protected.

The tract has been described as a conservation jewel and is part of a site that was ranked second most important for threatened birds and amphibians in the world. The partially forested property is being restored, and its protection is critical, since it supports an important concentration of Andean wax palms (*Ceroxylon ceriferum*) needed by the parakeet for nesting.

The property will become part of the El Dorado Reserve, which was created in 2006, when conservation groups partnered to protect 1,600 acres of key parakeet habitat near a national park. Additional land acquisitions in 2010 and 2012 enlarged the reserve to its current 2,250 acres.

The reserve is located on the northwest slope of the Sierra Nevada de Santa Marta, only a few miles from the Caribbean Sea. Its collection of tropical wet life zones has resulted in extraordinary diversity: 635 bird species and no fewer than 19 endemic species have been recorded, including Santa Marta

Bush-tyrant, an endangered flycatcher. The reserve also provides critical habitat for more than 40 Neotropical migratory birds, including Golden-winged Warbler and Blackburnian Warbler.

Santa Marta Parakeet nests in natural tree cavities but will use artificial nest boxes. It feeds on a variety of vegetation, nectar, fruit, and seeds and typically travels in small, swift, noisy flocks that fly at or below canopy level. Once settled in a tree, the bird tends to be silent and difficult to spot.

The creation of El Dorado Reserve and the acquisition of the La Cumbre Property were supported by Fundación ProAves, ABC, World Land Trust, Conservation International, and a host of other groups and individuals.



American Bird Conservancy is a 501(c)(3), not-for-profit organization whose mission is to conserve native birds and their habitats throughout the Americas. You can learn about visiting El Dorado Reserve at www.conservationbirding.org.

GPS for birds

Tiny tags are huge for the study of small birds

Our ability to describe exactly where a bird spends the winter, the routes it flies while migrating, and the timing of its movements has just taken a quantum leap forward. For the first time, a small migratory bird has been tracked using the super-accurate Global Positioning System.

Since satellite-based GPS technology became fully operational in 1995, it has been integrated into almost every facet of the world economy and revolutionized countless aspects of our daily lives, from cell phones to turn-by-turn driving directions. Yet its usefulness to wildlife studies has been limited.

The technology can provide locations with an accuracy of about 10 meters (33 ft), but until recently, the smallest model weighed about 12 grams (0.42 oz). Consequently, it could not be used safely on animals that weighed less than 250 grams (almost 9 oz), a little less than the weight of a Pileated Woodpecker.

But now a miniaturized unit an order of magnitude smaller than previous devices has become available. Weighing only about a gram, it can be worn safely by animals that weigh as little as 20 grams (0.7 oz), or about the size of a large warbler.

Wildlife biologists from the Smithsonian Migratory Bird Center used the tag recently to pinpoint the non-breeding locations of Ovenbirds captured in Maryland and New Hampshire that weighed more than 20 grams. The Maryland breeders flew to Florida and western Cuba. The northern birds migrated farther, taking up territories in eastern Cuba, the Dominican Republic, and Haiti.

Obtaining information so detailed from light-level geolocators or stable isotopes would have been impossible, write researchers Michael T. Hallworth and Peter P. Marra in *Scientific Reports*. “Non-breeding location data for Ovenbirds analogous to those obtained with GPS tags (~10m) would involve weeks of costly, labor-intensive fieldwork,” they conclude, “and the breeding origin of these individuals would be unknown.”



Meagan Lorenz

WIDESPREAD: Northern Saw-whet Owl occurs across North America.

A new state for saw-whets

Add Nebraska to the long list of breeding places

Tiny, big-eyed Northern Saw-whet Owl breeds in forests in more than three dozen states and provinces: from Alaska south to Mexico, across southern Canada, throughout the Great Lakes states to New England, and south through the Appalachians. Despite isolated areas in the western Dakotas where it occurs year-round, the species has been considered an “absent or very rare breeder” in the Great Plains.

But don’t tell that to ornithologists in Nebraska. They’d long suspected the owl nested in their state, especially after young birds were

spotted occasionally since 2002, but they didn’t have proof. So Wayne Mollhoff, coordinator of the Nebraska Breeding Birds Atlas, placed 27 nest boxes in several counties, and in March 2014, he hit the jackpot: four owlets in a nest in the Wildcat Hills State Recreation Area, in the state’s western panhandle.

Then, in February 2015, he found a second nest, in the Nebraska National Forest, near Crawford, about 80 miles north of the first nest. And in April, he spotted owls nesting again at the Wildcat Hills site. Will there be more?

Feathered but flightless

New dinosaur species is largest with bird-like feathers

Feathered dinosaurs from Liaoning Province, in northeastern China, have revolutionized our understanding of the connection between birds and their closest relatives. Most were covered with simple hairlike filaments, but a handful had wings and tails consisting of feathers similar to those of present-day birds, with central shafts and barbs.

The dinosaur shown at left, a new species related to *Velociraptor*,

is the largest yet discovered with bird-like feathers. More than five feet long, it had an orderly sequence of vaned coverts, primaries, and secondaries, but its arms were short and it probably did not fly. “It may be,” write paleontologists Junchang Lü and Stephen L. Brusatte, “that such large wings comprised of multiple layers of feathers were useful for display purposes, and possibly even evolved for this reason and not for flight.”



Chang Zhou

Zhenyuanlong suni, a new feathered dinosaur from the early Cretaceous (ca. 125 million years ago) of China.

(continued from page 8)

In Africa, the oxpeckers, the birds that ride around on zebras, impalas, and other large mammals, eat primarily ticks and other ectoparasites that feed on blood. Not only do oxpeckers (like the Red-billed Oxpecker shown on the opposite page) obtain blood indirectly via ticks, but they're known to peck at wounds and feed on blood and tissue, apparently keeping the wounds open for this purpose.

When cleaning out my nest boxes after the breeding season, I found numerous small white orbs in a box used by House Wrens. What were they? — Dawn Ware, Nashville, Tennessee

AThey were spider-egg cases. A male House Wren typically constructs several nests that are inspected by potential mates. (The female chooses the nest and completes building it.) The male commonly places spider-egg cases in the nest during the initial construction.

It has been thought that when the spiders hatch, they eat mites that might otherwise parasitize the nestling wrens, but this has been observed only in the lab. Experiments have indicated that the number of mites does not differ in nests with or without spider-egg sacs.

Another theory is that the orbs serve as ornamentation intended to tempt a female to choose a particular nest (and mate), but one study found that males that put spider-egg cases in their nests actually took longer to acquire a mate.

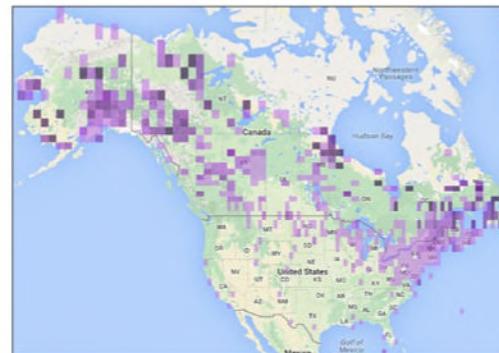
So far, researchers have not been able to find any benefit to

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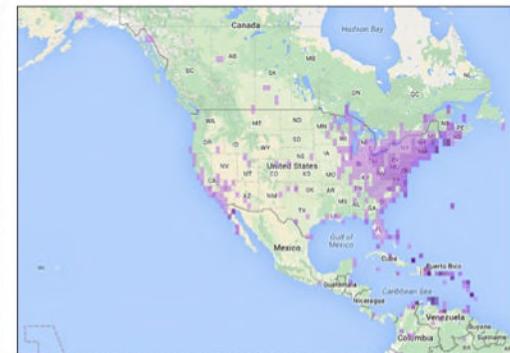
ON THE MOVE FROM eBIRD

A warbler and sparrow to watch for in fall

Blackpoll Warbler



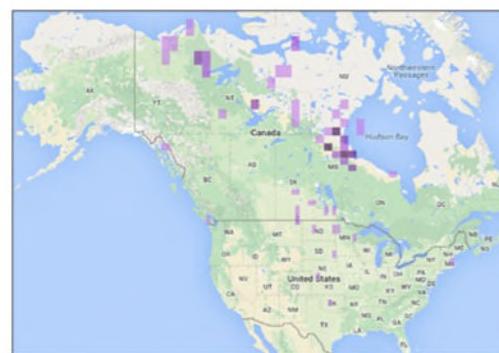
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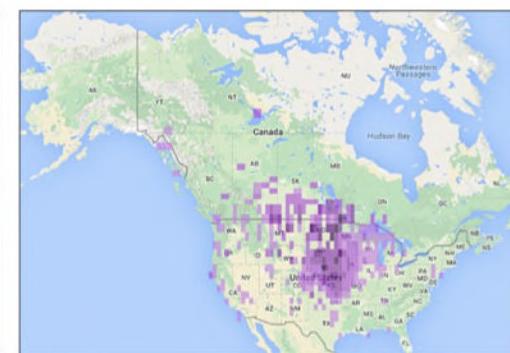
October 2004-14

These maps compare the distribution of Blackpoll Warbler in June and October using eBird data from 2004 to 2014. The species nests throughout the boreal forests of Alaska, Canada, and northern New England and has the longest annual migration of any North American warbler; some birds fly annually from Alaska to Brazil. The June map shows the warbler on its breeding range and as a migrant in the Northeast. Isolated purple squares in the western United States represent rare spring records at vagrant traps and other birding hotspots. By October, Blackpoll has largely vacated its breeding range. Many individuals fly nonstop from New England and eastern Canada over the Atlantic Ocean to Caribbean islands and northern South America, while others pass through the Great Lakes and mid-Atlantic states. It's rare in the central and southern states and has a strong pattern of vagrancy to California.

Harris's Sparrow



June 2004-14



October 2004-14

Black-bibbed, pink-billed Harris's Sparrow winters in the central United States and is the sole North American passerine that nests exclusively in Canada. The species is rare far to the east or west of the central states and provinces. In June, it is found largely from the Yukon Territory to northern Manitoba, where it nests along the transition zone between boreal forests and tundra. On the June map, purple squares in the central United States represent lingering northbound migrants. By October, the sparrow has almost completely left its breeding range and can be found in much of the central U.S. and southern Canada. In fall, vagrants can occur in any flock of White-throated or White-crowned Sparrows across North America, generally along hedgerows, weedy patches, shelterbelts, and, rarely, at feeders.



eBird is the real-time online checklist operated by the Cornell Lab of Ornithology and Audubon. "On the Move" is written by eBird's Garrett MacDonald, Chris Wood, Marshall Iliff, and Brian Sullivan. Submit your bird sightings at ebird.org.

The latest checklist

AOU makes no changes to Northern Cardinal and Painted Bunting

The American Ornithologists' Union released the latest supplement to its checklist of North American birds in early July. Among the many interesting changes:

- Herald Petrel was split into two species: one that ranges throughout the South Pacific and has yet to be recorded in the ABA Area, and another that is spotted regularly but rarely off the Atlantic coast. The Atlantic species, which breeds on an island far off the coast of Brazil, was given the name Trindade Petrel.

- The two subspecies of Bahama Woodstar were recognized as separate species.

We reported online in early February about the proposal to split the hummingbird. The subspecies that lives on Great and Little Inagua will now be known as Inagua Woodstar.

- And Psittaculidae, a family containing lorises, lovebirds, and Australasian parrots, was broken out of Psittacidae, containing African and New World parrots, to reflect the groups' different evolutionary histories.

Just as interesting were two proposals that the AOU's checklist committee considered but chose not to accept.

One would have divided familiar Northern Cardinal

into six species, to be called Eastern Cardinal, Western Cardinal, Yucatan Cardinal, Cozumel Cardinal, Tres Marias Cardinal, and Long-crested Cardinal.

The other would have recognized the eastern and western populations of multicolored Painted Bunting as distinct species. Ornithologists have speculated for years that the two groups may be separate, largely because they winter and breed apart and molt and migrate according to different schedules.

We described the proposal to split them in our April issue. In rejecting it, reviewers

questioned not only whether the populations were truly isolated reproductively, but also the gap that is said to separate them.

One commenter encouraged other reviewers to look at an eBird map from June and July, suggesting that they would see "a series of records" from Mississippi to western Georgia. "It looks to me as if there are patches of likely breeders throughout the gap in the narrow fingers of bottomlands and along the coast in otherwise hilly, unsuitable terrain," wrote the committee member. "What population these represent is unknown."

Secret life of birds



FREE RIDE: A Red-billed Oxpecker perches on the horn of a Cape buffalo in Lake Nakuru National Park in Kenya.

(continued from page 10)

having spider-eggs sacs in the nest for either adults or young wrens. The exact purpose of the behavior remains a mystery.

The news of the recently rediscovered Colombian hummingbird, the Blue-bearded Helmet-crest, last seen in 1946, made me wonder how many other birds thought to be extinct have been rediscovered.
— Elizabeth Green,
Kirkland, Washington

Birds that went unrecorded even longer than the helmetcrest ("Birding Briefs," June 2015) have been rediscovered just in the last decade. Examples include Jerdon's Babbler, last seen in Myanmar (Burma) in 1941 and found again in 2014; Sillem's Mountain-finch, described in 1992 from two specimens collected in China in 1929, then not seen again until 2012; and Banggai Crow, of Indonesia, rediscovered in 2007 after having not been seen since the late 1880s. One of the longest-missing birds to be rediscovered is New Zealand Storm-Petrel. It was thought extinct since the 1850s but refound in 2003.

A study published in 2011 concluded that 144 bird species had been rediscovered over the last century or so.

Send a question

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PHOTO GALLERY

Recent rare-bird sightings in North America



FIRST IN CANADA: On July 4, this Magnificent Hummingbird visited a feeder near Bridge Lake, in central British Columbia.



FIRST IN MANITOBA: This Common Crane was spotted with Sandhills in mid-June at Churchill, on the western shore of Hudson Bay.

Jack Swistad



FIRST IN NUNAVUT: In early June, this White-winged Dove, a bird of Texas and the Southwest, was seen on Akimiski Island, in James Bay.



NINTH IN ALASKA: This Steller's Sea-Eagle, an east Asian species, was spotted in late June flying above Buldir Island, in the western Aleutians.

McKenzie Mudge/U.S. Fish and Wildlife Service



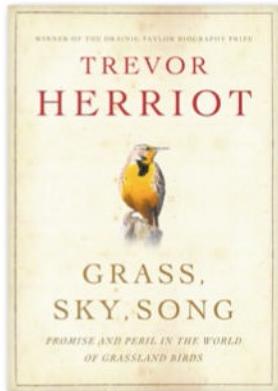
FIRST IN ALBERTA: In mid-July, birders found this Crested Caracara at Jasper National Park, far from its range in Texas and Mexico.



FIRST IN ONTARIO: In June and July, this Little Egret was seen on the Ottawa River. The species was also in Nova Scotia, Maine, and New York.

Josh Vandeemeule

What we're reading



GRASS, SKY, SONG

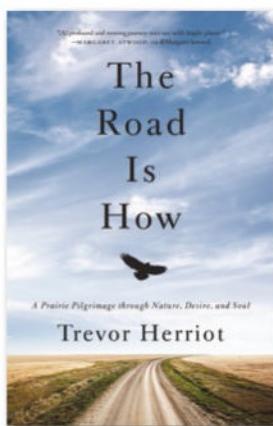
By Trevor Herriot

Any friend of C. Stuart Houston, author of our article about Turkey Vulture on page 32, is a friend of ours. Herriot is a naturalist, activist, and writer who lives on the Saskatchewan prairie. In this 2009 book, he describes trying to learn why grassland birds are declining. Along the way, he tells the story of how Houston became an ornithologist, and he finds hope in the farmers and ranchers who care for the land — and its birds.

THE ROAD IS HOW

By Trevor Herriot

Herriot's most recent book (2014) was sparked after he fell off his roof and cracked a few ribs. He soon decided to hike a prairie road near his home for three days, to get to know it better and to clear his mind. What follows is a thoughtful exploration of the land, its flora, and especially its birds, including meadowlarks, hawks, ducks, blackbirds, and avocets. More please.



Festivals + events

Three top-flight festivals not to miss this fall

The fall festival season is upon us. Here are three events we're looking forward to:

Cape Cod Bird Festival, Hyannis, Massachusetts

Field trips will visit the barrier islands of North and South Monomoy, Nauset Beach, and many other Cape Cod hotspots, and authors Miyoko Chu and Richard Crossley will speak. This event is coming up quick; sign up soon! **September 18-20**.

Bridger Raptor Festival, Bozeman, Montana

This festival celebrates the Bridger Mountains Hawk Watch, Hotspot Near You No. 171. Keynoter Kate Davis, the award-winning author and photographer, will discuss Peregrine Falcons, Golden Eagles, and owls. **October 2-4**.

Cape May Fall Festival, Cape May, New Jersey

The Cape May Hawk Watch, Avalon Seawatch, Monarch Monitoring Project, Morning Flight Songbird Count, and other migration-monitoring programs will be featured. Be sure to visit our booth to meet *BirdWatching* publisher Lee Mergner. **October 23-25**.

For festival contact info, or to list an event in our calendar, visit our website: www.BirdWatchingDaily.com/events

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Great Blue Heron, Gulf State Park Pier



Osprey

Photo courtesy of Gulf Shores/Orange Beach Tourism

Photo courtesy of Gulf Shores/Orange Beach Tourism

Alabama Gulf Coast: A birdwatcher's paradise

From a birding trail spanning over 200 miles to annual events celebrating the beauty of birds and nature, the Alabama Gulf Coast is the perfect stop for any bird enthusiast

A Great Blue Heron perches at the water's edge as a pelican dives into the turquoise waters for its first meal of the day. As the cool breeze blows in, so do the shorebirds and gulls, each flying to its favorite spot on the Alabama Coastal Birding Trail. Though the Alabama Gulf Coast is most known for its fresh seafood, beautiful beaches, and array of entertainment options, birdwatchers from near and far flock to the area to travel along the birding trail.

Many rare and diverse species make their home year-round on the Alabama Coastal Birding Trail. Covering over 200 miles of coastal paradise, this trail is the perfect destination for birders, especially during the spring and summer. The trail includes 50 birding sites that span two counties and are separated geographically into six different loops. These loops allow for birdwatchers to have a unique experience at every stop while also allowing them the opportunity to see everything the Gulf Coast has to offer.

Birdwatchers can begin at the Gulf Shores/Orange Beach loop, which overlooks the beautiful water of the Gulf Coast between Perdido Pass and the trails along the Gulf State Park. This area is the perfect location to spot an abundance of shorebirds and wading birds, especially during the summer

season. Gulf Shores and Orange Beach are also home to some of the grandest events on the Gulf Coast, including music festivals, art exhibits, and world-renowned culinary and fishing competitions. From delicious food to the sugar-white beaches, this area is one of the more popular on the birding trail. The Fort Morgan loop offers several different sites along the Bon Secour National Wildlife Refuge Trails as well as a stop at the grounds of one of the most historic Civil War battle sites, Fort Morgan.

Continuing on, birdwatchers can travel down the South Baldwin loop and stop at several excursions along the way. The Mobile Bay loop takes visitors through the Eastern Shore, goes across Mobile Bay, and ends on Blakeley Island. This area houses various local eateries and fun, family-friendly activities. The loop's scenic route allows birdwatchers to explore the cities of Baldwin County while also having the opportunity to view some very rare species, including the Bald Eagle.

Pack your bug spray for this next loop. The Mobile-Tensaw River Delta loop, though best explored by boat, proves to be a great stop to study songbirds, waders, kites, and many other species. Travel around the western shore of

Mobile Bay to the Dauphin Island-Bayou la Batre loop. During the spring migration, birds appear almost everywhere along this loop, making it one of the most popular locations along the trail.

To learn more about the trail, visit the website AlabamaCoastalBirdingTrail.com.

Not only is the Alabama Gulf Coast a birder's dream come true, but it is also a place engulfed by a relaxing atmosphere, and there are gorgeous sites around every corner.

Throughout the year, events for birdwatchers are held in various locations along the Alabama Coastal Birding Trail. One of the most anticipated is the John L. Borom Alabama Coastal BirdFest. Located in Fairhope, Alabama, the three-day festival will celebrate its 12th year October 1-3, 2015. Just as in years past, guided tours will be led throughout the birding trails, and new trips are being added, by foot and by boat, to show visitors the natural wildlife that inhabits the Alabama Gulf Coast. A Bird and Conservation Exposition will also take place over the weekend and is free to all attendees. With food, art, hands-on activities, live animals, and informational exhibits, there is something for bird lovers of all ages to enjoy. For more information, visit GulfShores.com/Birding or call 877-226-9089.

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Linda Dunne

NO BINOCULARS REQUIRED: Pete Dunne keeps watch for birds in his New Jersey backyard.

My little sit

Even a two-hour off-season Big Day can still be big

Two hours. One backyard in the middle of Mauritertown, in southern New Jersey. Off season.

You may be aware of the concept of the Big Day, a 24-hour birding marathon during which practitioners attempt to record as many species as possible in a prescribed area — the state of New Jersey, for example. A Big Sit is a Big Day in an area restricted to where you begin and end your day. Big Days are typically timed to coincide with the period of peak bird diversity, so spring.

Having limited time and mobility, and wondering what an off-season Big Sit in my own backyard might produce

on June 1, a date that typically signals the end of both peak bird diversity and spring birding in New Jersey, I grabbed a cup of coffee and plopped myself down on a chair on our back porch. My view faced east and offered a 60-degree snatch of landscape

and sky. More open vistas might have been found, but the chair was on the porch and close to the coffeemaker.

I started at 6 a.m. and found three species vying to be first on the list. Candidates included multiple singing

"I grabbed a cup of coffee and plopped myself down on a chair on our back porch."

American Robins, a singing House Wren, and 10-30 Chimney Swifts cutting cookie-cutter patterns across the sky.

Admittedly, a six o'clock start is late for a Big Sit, but the strategy for a Little Sit differs somewhat: With a mere two hours to fill, you choose the two most productive hours of the day — so the hours bracketing sunrise.

The daylight-only timetable cost me such nocturnal species as Great Horned Owl, Black-crowned Night-Heron, and Black Skimmer, all of which are active in the pre-dawn hours, but a pre-dawn start would have cost me Turkey Vulture and other thermal-loving aerialists.

But even in full daylight, vocalists continued to dominate my list until after sunrise, when my snatch of open sky began to bear fruit. Nothing is unusual about this: More than half of the birds recorded on an average Big Day are heard only.

By 7 a.m., my count stood at 22 species heard or seen. Nothing on my list was unexpected — except, perhaps, for the migrating Common Loon. June 1 is a little late for the species in these parts. April through May is when most wintering loons are heading inland.

Having accounted for most of the common birds, I added a mere 17 species in the second hour, including Baltimore Oriole, Cedar Waxwing, and Turkey Vulture. So 39 species in all from an ordinary yard during off-season — not bad for a postage-stamp property.

Did I mention that I wasn't using optics? Most of the birds were heard, anyway, so binoculars wouldn't have mattered. And my flight-identification skills are pretty polished after 40 years of practice.

But more than the birds recorded, what fascinated me were the species missed. For example, I didn't hear or see a

Laughing Gull, and no shorebirds were tallied, although some sandpipers were still lingering on Delaware Bay. I also recorded no ducks or egrets and somehow managed not to hear the dozen Canada Geese that were breeding less

Take Pete's challenge

How many birds can you identify from your yard in two hours? Please tell us. Be sure to include the date of your Little Sit, the name of the city and state you live in, and a brief description of your yard. For example, if you live near a park, lake, or other bird-attracting area, please say so. Email your list to LittleSit@birdwatchingdaily.com. We'll forward it to Pete.

than a mile and a half away. Later, on my morning walk about town, I heard Indigo Bunting, Prairie Warbler, White-eyed Vireo, Yellow-billed Cuckoo, and Belted Kingfisher. Despite their nominal proximity, they didn't make the Little Sit tally. Also missing was the Brown Thrasher and Orchard Oriole that nest nearby and the Bald Eagle whose nest is only two miles from our door.

Here a Little Sit is much like every other Big Day I've ever been on: What you remember most are not the birds you record but the species that elude you.

There you have it, readers. Thirty-nine species in two hours, all from a stationary deck chair. That is the June Little Sit record to beat. The ball's in your court. A new record is within reach. It's OK to use binoculars if you choose, and please let me know how you make out.

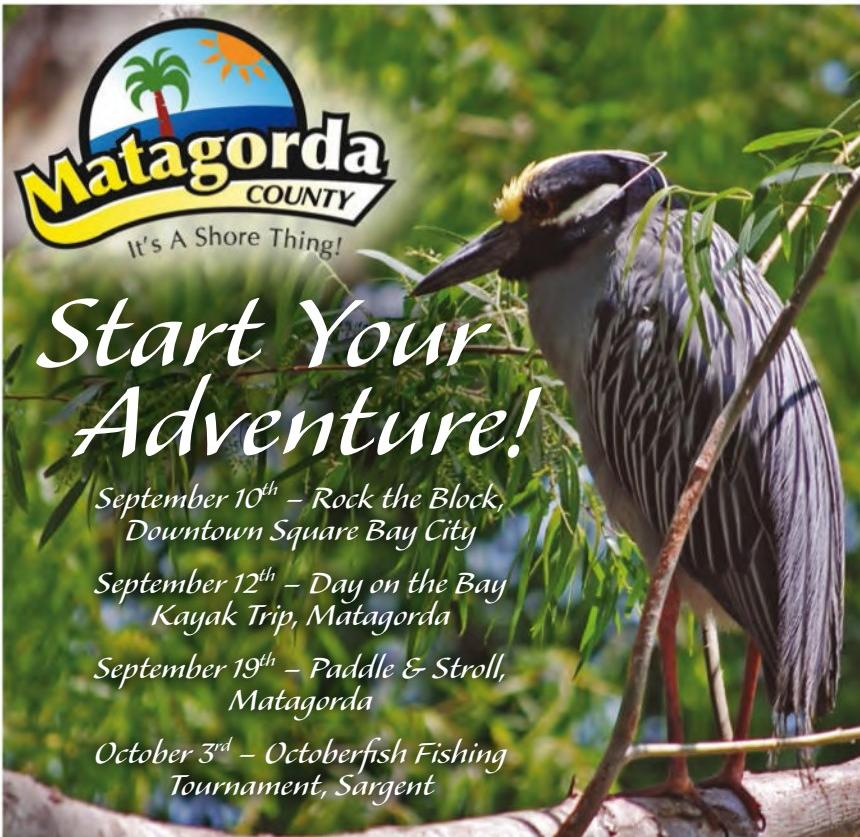
In retrospect, my effort was aided by a nearby leafless tree that proved to be a magnet to Cedar Waxwings, American Goldfinches, and other fly-by birds. Special thanks, too, goes to the fully leafed maple that blocked the morning sun, providing a squint-free view to the east, even after sunrise.

How many species can you squeeze out of your yard? I don't know. It depends upon your skill level and your location.

I urge you to set aside a mere two hours and try a Little Sit. See how many bird species you can identify. You could set a record every month, if you like.

Good luck.

Pete Dunne is New Jersey Audubon's birding ambassador at-large. He is the co-author of *Hawks in Flight: The Flight Identification of North American Raptors* (2nd edition) and the author of *The Art of Bird Identification: A Straightforward Approach to Putting a Name to the Bird* and other books about birds.



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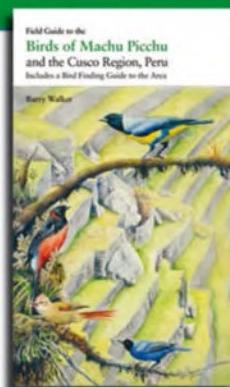
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UNMISTAKABLE: A Snowy Owl stretches feathered feet and toes toward a fencepost. Its relatively narrow wings can measure five feet from tip to tip.

Snowy enigma

Nomadic Snowy Owl is the world's most recognizable and most misunderstood owl

BY SCOTT WEIDENSAUL

SCOTT WEIDENSAUL is a talented author who writes about subjects we find fascinating — the history of American birding, a trip across the continent in the footsteps of James Fisher and Roger Tory Peterson, a worldwide search for vanishing plant and animal species, the sweeping story of bird migration.

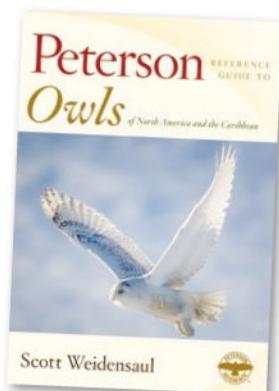
He is also a licensed hummingbird bander with a keen interest in western species that stray east each winter and a co-founder of Project SNOWstorm, the ambitious multi-state study of Snowy Owl, another charismatic species with a tendency to wander.

The following text blends his considerable storytelling abilities and research interests. It's an excerpt from his latest work, Peterson Reference Guide to Owls of North America and the Caribbean, to be published by Houghton Mifflin Harcourt in October.

Perhaps the most recognizable owl in the world, the Snowy Owl has also been one of the most thoroughly misunderstood. Assumptions about almost every aspect of its life — its breeding and wintering ecology, the driving forces behind its dramatic irruptions, how to distinguish different age and sex classes in the field,

even something as basic as how many there are in the world — have undergone a tectonic shift in the past 15 years, upending much we thought we knew about this beautiful Arctic raptor.

Much of this new knowledge has come from the use of high-tech tracking devices, which have allowed scientists to finally



NOT BOthered by the COLD:
Snowy Owl chicks kept warm by
gray juvenile down huddle in a
nest on Bylot Island, Nunavut,
north of the Arctic Circle.



follow what may well be the world's most nomadic bird — one that may move hundreds of miles between breeding sites, and thousands of miles between wintering areas, from one year to the next. It is a species so supremely adapted to the Arctic that some Snowy Owls actually migrate *north* in winter, hunting the desolate surface of the pack ice in the perpetual gloom of the Arctic winter — a behavior that was also only recently uncovered.

Restricted as a breeding species to a narrow rim of Arctic coastal tundra on the most northerly land areas on the planet — and dependent there on lemmings, whose population cycles are in turn threatened by changes to temperature and precipitation — the Snowy Owl may also be among the world's species most immediately at risk from climate change. Although populations appear stable, the recent recognition that global Snowy Owl numbers are but a fraction of what scientists had long believed makes this vulnerability even more worrisome.

DISTRIBUTION

BREEDING SEASON: Limited to Arctic and subarctic tundra zones in northern Canada, extending south to extreme northern Labrador and Quebec, Cape Churchill in Manitoba and northwest across Nunavut and the northern Northwest Territories, along the Beaufort Sea coastal plain of Yukon and Alaska, and south along the Chukchi and Bering sea coasts of Alaska to Hooper Bay. There are historic breeding records from the western Aleutians as well as Saint Matthew, Saint Lawrence, and Hall Islands in Alaska, but these areas cannot be considered part of the species' normal breeding range.

Most range maps probably overstate the normal breeding distribution of Snowy Owls. Given their highly nomadic nature and their habit of concentrating where lemming populations are at cyclic peaks, much of the breeding range may have few or no Snowy Owls in any given nesting season. The most consistent areas for breeding appear to be extreme northern Alaska

around the Point Barrow peninsula, and the islands of the Canadian High Arctic. Breeding in the more southerly areas of “normal” summer distribution, in regions like the Ungava and Labrador Peninsulas, may be much less frequent than originally believed.

NON-BREEDING SEASON: Regular winter resident in northern Alberta and Saskatchewan (most reliably), the northern New England coast south to Cape Cod, the Saint Lawrence River valley, and parts of the northern Great Lakes. Irregular winter visitor along the coast to Long Island and New Jersey, the upper Midwest, northern Great Plains, and the coast of southern British Columbia, Washington, and Oregon.

In major invasions, Snowy Owls have been found as far south as Florida, Mississippi, and Texas, although the normal southern boundary even in major flight years is more typically the Mid-Atlantic coast through the central Great Plains, north to Wyoming and Montana and west to Oregon and the northern Central Valley in California.

MIGRATION AND MOVEMENTS: Irruptive, although a regular winter migrant into the northern Great Plains, and even outside of this area lesser or greater numbers of Snowy Owls appear every winter in southern Canada and the northern United States.

AUTUMN MIGRATION: Generally irregular and irruptive in nature, although Snowy Owls are regular southward migrants to a few areas. Satellite tracking has shown that many adults remain in the Arctic for the winter, or even migrate north from their breeding areas.

Although most people assume that hunger drives erupting owls south, in major Snowy Owl invasions the cause is usually extraordinary plenty, not privation. Major invasions are usually the result of extremely high chick production the previous summer — which, in turn, is the result of a cyclical peak in the population of lemmings on which nesting owls feed. Such invasions are largely (at times almost exclusively)

comprised of young birds making their first migration, and these birds tend to be in excellent physical condition, contradicting the long-standing assumption that erupting Snowy Owls languish and starve on the wintering grounds. (More rarely, smaller flights, made up primarily of adults, may occur; these invasions may in fact be driven by prey scarcity in the Arctic, and such birds tend to be in poorer physical condition.)

Many factors may determine what triggers a large invasion. While a bountiful breeding season is an obvious requirement, other elements are believed to play a role. These may include early and heavy snow in the Arctic, the availability of alternate prey, like Willow Ptarmigan and hares, and weather patterns in late autumn and early winter that may push the owls into the northern edge of the boreal forest, prompting a rapid transit south until they reach more suitable habitat.

The earliest migrants into southern Canada and the northernmost U.S. states rarely appear before late Oct., with the bulk of both eruptive and non-eruptive migrants arriving in Nov. and Dec. to the north, and into early Jan. to the south. In the Northeast, young males tend to arrive first (and perhaps average the farthest penetration south), with immature females appearing later in the winter and possibly displacing males. However, Keith (1960) found the opposite in Manitoba, with females arriving first, usually in Nov. Telemetry studies have shown that some individuals move extensively through the winter, making significant (>150 mile/390 km) flights in a few days, while others remain in very limited (1 square mile/2.6 sq. km) winter territories for months.

SPRING MIGRATION: Northward movement may begin as early as Feb., though some individuals linger until

May, and a handful of over-summering records exist usually following a major invasion. Earlier departure dates (late Feb. through early Mar.) were reported from the Great Plains among predominantly adult owls than among predominantly juvenile birds in the Northeast (late Mar. and early Apr.). Because Snowy Owls are not thought to breed until at least their second full summer, the adults likely feel a greater urgency to return to the breeding grounds.

“Satellite tracking has shown that many adults remain in the Arctic for the winter, or even migrate north from their breeding areas.”

Eleven of 17 satellite-tagged owls in coastal Massachusetts began their spring migration between Mar. 21 and Apr. 11, with the latest remaining until

Apr. 27. Telemetry tracks showed that the Saint Lawrence River valley was an important stopover site in both spring and fall. By contrast, three GPS-tagged owls from inland Pennsylvania departed Mar. 15 to 19 in concert with mild temperatures and south winds, moving north and west to Lakes Erie and Ontario. Some owls made rapid, moderately long movements of several hundred miles in a night or two. One owl, which remained in western Quebec at a large open-pit gold mine, died in late June of undetermined causes.

POST-FLEDGING DISPERSAL: Poorly studied, but one famous example likely represents a record for any owl species. Out of a single nest of seven chicks banded in 1960 on Victoria Island in the Canadian Arctic, one was subsequently shot on James Bay, one in southern Ontario near Ottawa — and one on Sakhalin Island in extreme eastern Russia, then part of the USSR, roughly 4,000 miles (6,100 km) from its birthplace.

DISTRIBUTION OUTSIDE THE COVERAGE AREA: Circumpolar in distribution, breeding from eastern Siberia across the northern extent of tundra to Franz Josef

Land and Svalbard, the Norwegian mainland, and Greenland, although areas of regular breeding are much more localized within this range. Winters irregularly across northern Europe and Eurasia.

HABITAT AND NICHE

In its breeding range, the Snowy Owl inhabits open, shrub-free tundra, usually picking a higher, drier spot for its ground nest. Although Snowy Owls have been reported nesting on alpine plateau tundra in Norway, in North America they are restricted in summer to elevations below 660 feet (200 m), generally along coastal plains and Arctic islands.

In winter, those owls moving south of the boreal forest belt gravitate to a variety of open-country situations, ranging from coastlines and beaches (perhaps the most common winter habitat in the East, upper Great Lakes, and Pacific Northwest) to farm fields, grasslands, bogs, industrial zones, and even urban centers, where an abundance of flat-topped buildings provide the unbroken sightlines they prefer. The more open, the better; in irruption years, for example, Snowy Owls in Pennsylvania are found most often in farming areas with large Amish and Mennonite communities, whose farms tend to be heavily cropped, with a minimum of trees and fencerows — creating the kind of expansive, uncluttered horizon that makes a Snowy Owl feel at home.

Human activity — especially vehicular activity — is rarely much of a deterrent. Whizzing traffic doesn't faze them, and busy metropolitan airports are dangerously attractive to migrants, posing a hazard to both the owls and the planes that may strike them. In the mega-irruption of 2013-14, more than 150 owls were trapped and relocated from Logan Airport in Boston alone. Recent satellite tracking has found that

some adult Snowy Owls winter on the Arctic pack ice, spending up to 3 months at a time in this seemingly inhospitable, perpetually dark environment. The owls appeared to focus on open-water polynyas, where they presumably prey on concentrations of wintering waterbirds, especially eiders, Long-tailed Ducks, and small alcids. GPS tracking of juvenile Snowy Owls showed that some of these birds pursued a similar course on the ice-bound Great Lakes, spending weeks at a time among giant, wind-driven ice sheets on Lakes Erie and Ontario and presumably hunting waterfowl or gulls in the constantly shifting leads of open water.

BEHAVIOR

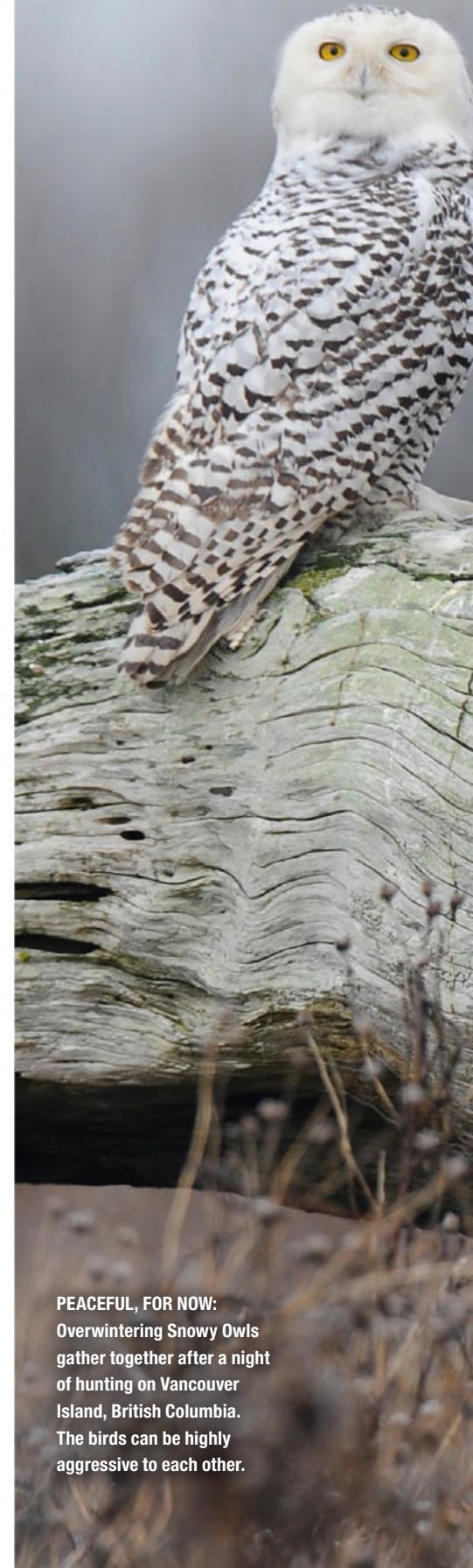
Snowy Owls are enigmas — birds that, in many respects, turn normal avian convention on its head, but which are also in some regards more "typical" an owl than they are given credit for.

Virtually every species of bird exhibits what ornithologists call "site fidelity" — a drive to return, often with astonishing precision and regularity, to the same nesting and wintering location every year. Snowy Owls stand in stark contrast to this almost universal rule. They are perhaps the most completely nomadic bird in the world, rarely showing any attachment not only to a particular nest site or wintering location, but even to a general region of the

circumpolar north. A Snowy Owl that breeds in Alaska one year may be nesting in Siberia the next, and northern Canada the year after that; its wintering grounds may shift by a thousand miles or more from season to season. A study of

Snowy Owls in Nunavut found that the average distance between breeding sites was almost 500 miles (800 km), and was as great as 763 miles (1,228 km).

There are exceptions, however. Snowy Owls regularly winter in the northern Canadian prairies, with band returns



PEACEFUL, FOR NOW:
Overwintering Snowy Owls
gather together after a night
of hunting on Vancouver
Island, British Columbia.
The birds can be highly
aggressive to each other.





NOMAD: A Snowy basks in golden early-morning sunlight in Boundary Bay, on the Washington-British Columbia border, in March 2012.



suggesting that some birds return annually or near annually and defend winter territories. Satellite tracking of Snowy Owls tagged in Massachusetts showed that many of the marked birds made return flights south in subsequent years into southeastern Canada and New England, and none of the tagged birds left eastern North America.

The Snowy Owl's daily activity pattern is also badly misunderstood. Most published references to this raptor — not only those written for a general audience, but many scientific publications as well — refer to it as diurnal. And it's true that Snowy Owls are active in the broad daylight of an Arctic midsummer day — though they have little choice in this, given that the sun doesn't set there for months on end. Any Arctic organism is, by simple default, diurnal for at least part of the year.

So while it's true that Snowy Owls are more active in daytime than many owls, when they have a choice — at a time or place where darkness falls — they are clearly nocturnal, like most owls. And of course they are fully nocturnal if they winter, as many do, north of the Arctic Circle where the sun barely lightens the sky to a dim gloom in the middle of winter. The cold is no obstacle — laboratory experiments have shown that Snowy Owls can survive temperatures below -90°F (-67.7°C), the lowest reading ever recorded in the Northern Hemisphere, and captive Snowy Owls survived five hours at -135°F (-93°C) with no sign of tissue damage or frostbite.

Snowy Owls wintering south of the boreal forest make full use of long winter nights for travel and hunting. During the day, an owl

generally finds the most open, treeless spot it can, usually perching on or very close to the ground, and often huddled against a concealing object — a fencepost, a pile of snow or ice, an airport taxiway sign, a driftwood log, or clump of grass on the beach. If undisturbed by humans, it may not stir all day — and while it may take advantage of an easy meal if prey presents itself, serious hunting usually takes place after dark.

As the sun settles, the owl becomes more active, ruffling and preening, stretching its wings, and sometimes regurgitating a pellet. As twilight gathers, it will fly up to a high perch — a dune or old post, a utility pole, barn roof, any position with a commanding view of the neighborhood. If potential prey is in view, the owl may go through exaggerated head-bobbing and craning before launching itself on the attack. With full darkness, the owl heads off for the night, sometimes flying miles from its daytime roost to search for prey before returning in the morning.

One revelation from GPS tracking is confirmation of the degree to which some Snowy Owls hunt over open water. Several immature owls, tracked along the Mid-Atlantic and New England coasts, made repeated flights of a third to half a mile (.5-.75 km) out over open water of bays and the Atlantic Ocean after dark, often using the same channel markers and

buoys as perches, presumably hunting for waterfowl. Interestingly, other Snowy Owls wintering in the same areas

restricted their hunting to beaches and salt marsh habitat, rarely venturing over open water. More than one observer has noted their falcon-like flight; Snowy Owls are capable of easily overtaking fast-flying prey like ducks and alcids, and picking off

agile songbirds like larks and buntings.

One of the most striking characteristics of Snowy Owls is their naiveté toward humans; it's often possible to approach them so closely that casual observers may conclude the owl is sick or exhausted, instead of merely disinterested. Especially outside their typical winter range, where a single Snowy Owl may attract large crowds, repeated disturbance from birders and photographers has sometimes prompted authorities to post guards.

Off the breeding grounds, Snowy Owls may be highly aggressive toward one another (with females usually dominating smaller males), but they may also gather in small groups in apparent peace. Perhaps the largest concentration recorded in North America was at Cape Race, Newfoundland, at the beginning of the 2013-14 irruption, when an extraordinary 306 owls were counted on the peninsula, 75 of them visible from one spot. Many of the owls in this group displayed erect ear tufts, likely a sign of unease and agitation in the presence of so many others owls.

TABLET EXTRAS
Tap the links below to learn more about Snowy Owls and the author.

PHOTO GALLERY
See photographs of Snowy Owls.

PROJECT SNOWSTORM
A study of Snowy Owl irruptions co-founded by Scott Weidensaul.

OWL HOTSPOT
Directions to fields near Calgary where Snowy Owls gather every winter.

SNOWY VS. FALCON
An account of a clash between a Peregrine Falcon and Snowy Owl.

SCOTT WEIDENSAUL
The author's website, describing his publications, research interests, and public appearances.

HUMMINGBIRD BANDER
A video in which Scott Weidensaul bands an Allen's Hummingbird in Pennsylvania.

No tablet? Find a link to all Tablet Extras at www.BirdWatchingDaily.com/the-magazine/current-issue

Scott Weidensaul has written more than two dozen books on natural history, including the Pulitzer finalist *Living on the Wind*, about bird migration. He has been studying owl migration for 20 years and codirects Project OwlNet and Project SNOWstorm. He lives in Schuylkill Haven, Pennsylvania.

"One revelation from GPS tracking is confirmation of the degree to which some Snowy Owls hunt over open water."

J. J. Audubon

EARLY BIRDS

Newly digitized drawings show Audubon's development years before he produced *Birds of America*

THE ART OF JOHN JAMES AUDUBON is so well known that he may be called the most familiar wildlife painter of all time.

Yet our appreciation stems almost exclusively from the works of the mature naturalist — that is, from the dramatic, hand-colored masterpieces he published in his book *Birds of America*. Its first installment didn't appear until 1827, when he was already 42 years old.

Audubon began drawing birds as a boy in France, where he lived for most of his childhood. Yet throughout his career, he destroyed his drafts and kept only his best drawings. As a result, only two collections of his youthful work survive.

One, housed at Harvard's Houghton Library, preserves some of his earliest originals: 114 drawings dated between 1805, when he was only 20, and 1821. Expertly conserved, digitized, and now made available online, the drawings not only reveal Audubon's progression as a young artist but provide a bridge from the sparse portraits standard at the time to the lush tableaux that became his signature.

The early works are among the first known scientific illustrations of animals in lifelike poses in their natural environments. "What he did that was unusual was not only posing them in a different way, but including plant material, trees, a bit of their natural habitat," explained Leslie Morris, curator of modern books and manuscripts at Harvard. "In the Houghton drawings, you can really see that developing over time."

We hand-selected 10 of the early works to show here. Among them are several of our favorite birds, one Eurasian woodpecker, and two North American species that still fly only in our memories.

Images courtesy Houghton Library,
Harvard University (MS Am 21)



Carolina Parakeet (June 1811)



Red-bellied Woodpecker and Yellow-bellied Sapsucker (undated, not before 1804)

Great Crested Flycatcher
mucicapa crinita



Drawn by J. J. Audubon

House Wren A. W.

House Wren (undated)



Scarlet Tanager on a mulberry branch (August 1810)



Red-winged Blackbird on a milkweed (June 1810)



Chuck-will's-widow (June 1821)

Osprey holding a white sucker (1806)



TABLET EXTRAS

Tap the links below to read more about John James Audubon.

ONLINE ARCHIVE

Scroll through all 114 drawings.

BIRDS OF AMERICA

The complete set of 435 plates from Audubon's masterpiece, housed at the University of Pittsburgh.

NAMESAKE

The National Audubon Society's brief biography of the artist.

REMARKABLE

Listen to a podcast from Yale University in which an antiquarian-books expert calls *Birds of America* "one of the most remarkable books ever created."

MILL GROVE

Learn about Audubon's first home in America, now preserved as the John James Audubon Center at Mill Grove, in Pennsylvania.

No tablet? Find a link to all Tablet Extras at www.BirdWatchingDaily.com/the-magazine/current-issue



Great Spotted Woodpecker (undated)



Great Crested Flycatcher (undated, not before 1801)



BONUS
See 8 more
drawings



A JOY TO BEHOLD: Turkey Vultures in central Saskatchewan and Alberta breed farther north than any other vulture in North America.

Northern novelty

What wing tags, satellites, and trail cameras are revealing about Saskatchewan's recently arrived Turkey Vulture

TEXT BY C. STUART HOUSTON, PHOTOS BY BRENT TERRY

YOU CAN GAIN extra satisfaction when you learn about the anatomy and physiology of each species you see. Beginning birders in Saskatchewan are particularly pleased when they learn the many amazing adaptations of vultures.

These include the birds' deeply slotted wingtips, developed for gliding and soaring in migration to Venezuela or Colombia each year; their large olfactory apparatus, which gives them a heightened sense of smell; weak feet, associated with a dietary dependence on carrion; and the diminutive naked red head of adults, which allows them to feed deep inside carcasses without accumulating the gore that would stick to head feathers. The vulture's stomach carries hydrochloric acid so strong that almost every bacterium is killed quickly. Even the dreaded anthrax spores are neutralized.

Seen up close, the vulture truly is ugly. Some subspecies, including *Cathartes aura meridionalis* in Saskatchewan, have prominent caruncles — small, fleshy excrescences on their heads and necks,

postulated to represent signs of fitness. What's more, as an eater of rotting meat, it stinks. It defecates profusely from the top of its perch tree, and it may drool or even vomit on you if you should happen to walk beneath it. And if skunk has been a recent diet item, only a gas mask can make a close approach bearable. A nearly grown vulture nestling, eight weeks old, hisses, drools, and vomits. A conservation officer called by a distraught farmer misunderstood this normal behavior as illness and took the vomiting nestling to the nearest veterinary clinic.

Ornithologists still aren't certain where to classify these ugly, smelly birds. Are they the most primitive of raptors, or, because of the weak grip of their claws, should we classify them with the storks? The American Ornithologists' Union moved them from raptors to storks in 1998, then back again in 2007. A leading systematist, Richard Banks, confided that vultures may eventually be placed in a new and separate order all their own.

If you were a suburbanite with a one-acre property in any southern state, I would forgive you for calling the Turkey Vulture a "trash bird." Many Saskatchewan farmers, however, take the opposite viewpoint. They profess to love the slow-moving black giant, present only in recent years and still increasing in numbers. They are delighted to see it because its presence is a novelty, and hence exciting.

Turkey Vultures are huge. They weigh up to four pounds, and their usual wingspan is 70 inches, just short of six feet. (The birds adopt their characteristic spread-wing posture when courting, to warm up in early-morning sunshine, to cool during the heat of the day, and to dry out when wet.) Though clumsy on the ground, they are the epitome of grace in flight, a joy to behold. Making use of thermals, adults soar effortlessly, up to a thousand meters, more than 3,000 feet, above ground, rarely flapping their wings but sometimes demonstrating a rocking flight.

On the move in autumn

Not all of North America's Turkey Vultures migrate. Birds that breed in the north and west are more migratory than eastern populations. Vultures in the Southwest, in Florida and other Gulf states, and along the southeastern Atlantic coast are generally resident.

The birds leave their northern breeding areas from late August to early November. Many western migrants pass through South Texas beginning in September and Panama, at the other end of Central America, from mid-October to early December.

Eastern migrants arrive in wintering areas in southern Florida from early October into November. Flocks are seen flying south from the Florida Keys from late November to mid-December, but their destination is uncertain. Populations in Cuba and Puerto Rico do not increase during winter.

Scent of a human

Turkey Vultures have an excellent sense of smell that enables them to find dead animals concealed beneath a forest canopy, to avoid danger, and, seemingly, to detect the presence of humans hidden out of sight. A British film crew learned from experience that vultures will not enter a house if a cameraman is hiding there, even though the blind had been set in place weeks before.

Video cameras placed near two separate nests by a different nature photographer resulted in the adults deserting their half-grown young.

"From 2003 to 2014, all 227 of our successful Saskatchewan nests have been in deserted buildings."

Vultures are thus special in many ways. Any farmer who listens regularly to *Birdline*, naturalist Trevor Herriot's once-a-month program on CBC Radio, knows that the bird is a scavenger or "garbulator," and therefore a valued service provider in rural areas. Listeners will also have learned about me, the retired medical doctor in Saskatoon who chairs the largest Turkey Vulture study in North America. Farmers phone in to report vultures that perch regularly on and in deserted farm buildings. Usually these represent nest sites not previously known to us.

The first nest in Saskatchewan was recorded over a century ago, in 1892. Some of the province's first 29 nests were sighted over several years. Twenty-two of the first recorded breeding attempts were in caves. Another 16 early nests were on the ground under dense vegetation. This is a more complete 19th-century record than for any adjacent state or province. In 1972 and 1974, I twice placed leg bands on two nestling vultures in accessible caves, first on the North Saskatchewan River southwest of Eston and then in the conglomerate cliffs on the Saville Ranch, northwest of Eastend.

In hot weather, vultures cool themselves by passing a mixture of urine and feces down their legs, a behavior known as *urohidrosis*. Leg banding ceased in 1976, after my late friend Ed Henckel re-caught 14 of the 76 Turkey Vultures he had leg-banded in New Jersey and found that the feces had hardened into a cement-firm mass around the aluminum band on all 14. On each vulture, the tarsus was eroded and the foot swollen. The bird limped when it walked, and its swollen leg hung down slightly when it flew. The banded leg on one vulture required amputation. A decree went out from the banding offices in Laurel, Maryland, and Ottawa: leg banding of the species was then prohibited.

FROM CAVES TO ABANDONED FARMS

The Turkey Vulture is much more numerous in the eastern and southern

states, where it lives year-round or migrates short distances as far south as the tip of Florida. Only vultures from the northern interior make the long journey to Venezuela. Each year, an increasing number, up to two million, passes over the watch site near Cardel, east of Mexico City in Veracruz, Mexico. En route, the vultures are the single greatest bird hazard to military aircraft because of their large size, wide distribution, occurrence at high altitudes, and disinclination to take evasive action.

The species breeds farther north in central Saskatchewan and adjacent Alberta than anywhere else in North America; the Black Vulture does not extend this far north. In the past 20 years, Turkey Vultures have spread out from river valleys across parkland and southern forest edges. Caves along riverbanks and an occasional steep lakeshore were once their only permanent nest sites. Looking for a dark enclosure, hopefully one protected from heavy rain, the birds would search piles of newly cleared aspen trees, sometimes to find a cave-like brush pile with a cavity inside. Most of these collapsed within a year, making a second year of usage improbable.

Gradually, about 1950, some opportunistic vultures began moving into unused buildings in Illinois. The habit slowly spread north. The first recorded nest in a farm building in Saskatchewan was at the northern edge of Moose Mountain Provincial Park, in the southeastern corner of the province, in 1982. The first three nests in abandoned farm houses in the Saskatoon bird area were not found until 2002.

The 2002 discovery triggered a quick response. We decided to follow the example of bander J. D. Bitner in Ohio, who had applied 40 wing tags to Turkey Vultures between 1975 and 1979. I paid photographer Brent Terry's airfare to Orange County, California, where zoologist Peter H. Bloom employed a technique used to teach missionary doctors in Africa new but simple surgical

WINGS UP: Hungry
Turkey Vultures feed on
a carcass discovered
in the Rio Grande Valley
in Texas.



Tom Vezo/Minden Pictures

skills: "See one, do one, teach one." Brent watched Pete apply a wing tag and then did the next one under Pete's supervision. Brent came home and taught all the subsequent patagial-tag appliers in both Saskatchewan and Alberta.

We apply flexible, fold-over wing tags that are inserted aseptically by a rivet gun to an area at the bend of the wing that has few blood vessels. Rarely do we see even one drop of blood. Saskatchewan tags are made of durable Herculite, an appropriate name. The upper and lower limbs of each tag bear the same large, unique alphanumeric inscription. Most consist of a letter followed by two numbers, in white. The letters and numbers have remained sharply defined for 12 years so far.

Since 1982, in Saskatchewan, most pairs of vultures have chosen a new type of cave equivalent — a distant basement corner, a former clothes closet, or, most often, a dark recess in the attic of a deserted farm house. A glassless window, an open door, or a large-enough hole in the roof is required to allow entry. On top of my Toyota 4Runner, we carried two 10-foot-long aluminum sectional ladders

made in Sweden, the right length to reach an upstairs window in nearly any house.

As both farms and their machinery increased in size, many houses were vacated. Their availability caused vultures to move to new breeding territory 100 or 200 miles distant from the former caves in riverbanks. Vulture numbers also increased because extra food became available — such as carcasses of deer killed by high-speed traffic on straightened highways. Then bovine spongiform encephalopathy, "mad-cow disease," appeared in a few Saskatchewan cattle herds. Sale of beef south into the United States ceased, and prices fell. Desperate farmers who could no longer afford to buy feed shot healthy cows.

Each year, vultures increased across wide areas of Saskatchewan parkland where none had bred previously. We have not heard of an active nest in a cave since 1996, although in 2014 impassable roads prevented us from visiting a cave near Wood Mountain, in extreme southern Saskatchewan. From 2003 to 2014, all 694 of our successful Saskatchewan nests have been in deserted buildings.

The great majority were in one-, two- or three-story houses, as well as in four decadent country school buildings, one rural store, several granaries, and a small number of barns.

NO NEST, JUST EGGS

Vultures do not fashion a nest of any kind, but they will deepen a slight depression on a dirt floor by moving their breast. They will also gently clean a dust-free spot on solid surfaces, making sweeping movements with their bill and wings. The birds deposit two eggs, two days apart, on the floor of a cave or on plywood, linoleum, cement — and, once, on a mattress on the floor of a deserted house.

Infrared trail cameras in houses in Saskatchewan have recorded 38–40 days of incubation, the two adults alternating, and another 10 days or less of brooding, depending on weather. In most nests, the young are then left to themselves. Each parent returns, on average, only once a day, for a one- or two-minute regurgitation of meat to the young. One or both adults may spend the night up to 39 kilometers (24 miles)

TWO-TONED WINGS: Photographer Brent Terry gently extends the wing of a just-tagged Turkey Vulture, showing the slotted tips of its primary feathers.



TABLET EXTRAS

Tap the links below to read more about Turkey Vultures and C. Stuart Houston.

PHOTO GALLERY

Excellent reader photographs of Turkey Vultures.

VENT-PIPE THERMALS

Turkey Vultures in Pennsylvania and Brazil have been documented soaring in artificial updrafts.

MARKING VULTURES

The author's 2005 paper describing the switch from leg bands to patagial tags (PDF).

OWL OF OWLS

C. Stuart Houston's article about a one-of-a-kind Great Gray Owl discovered during the 2004-05 irruption.

TREVOR HERIOT

The website of the prairie naturalist, activist, and writer.

BIRDING VERACRUZ

Read about the trogons, hummingbirds, and other Mexican specialties you can see near the famous hawkwatch.

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from their nest. Such behavior in any other species would be rated as neglect. I call it parenting in absentia, possible only because they have no major natural enemies except the raccoon, which we have photographed eating vulture eggs but not, as yet, their smelly young.

Because of the openings in deserted buildings, the odors are more tolerable than in enclosed caves. Only twice did we encounter young emitting the odor of recent striped skunk. My 4Runner, even after a thorough cleansing, and after leaving windows open, still had residual odors for another week.

A half-grown vulture and an adult each require 140-200 grams (5-7 ounces) of meat each day. However, they go almost without food during migration. They wait until mid-morning on a sunny day, flap their wings energetically a few times to get airborne, and then soar in thermals until late afternoon, when the up-drafts fade. In searching for food within 20-40 kilometers (12-24 miles) of their nest, a similar energy-saving use of thermals applies.

The time of wing-tagging is determined by the age of the nestlings. At this

high latitude, we begin tagging in the first week of August. Ideally, the young should be 50-64 days old. The tagger enters the house while one to three other observers watch outside. An occasional nestling is strong enough to fly a quarter mile on its first-ever flight; taggers may have to climb several trees to retrieve it and return it to its nest house.

In our first year, 2003, we took care to revisit 12 of the 13 nest houses to ensure that all had fledged. Later, on two occasions, we discovered a tagged nestling that had fallen the previous year into a lower floor from which there was no exit. Apart from those two exceptions, on subsequent years' visits, there has been no evidence of nestling carcasses. Nearly all fledge successfully. This is in sharp contrast to Great Horned Owl and hawk nests, where a return visit a month later often finds the carcass of a young bird at or below the nest.

EFFORTLESS MIGRATION

We track vulture migrations using expensive 70-gram (2.5-ounce) body-pack satellite transmitters supplied to us by Keith Bildstein, Sarkis

How to report vultures

Every sighting of a tagged vulture adds to our scientific knowledge. If you have a wing-tag number to report, go to reportband.gov, the website of the Bird Banding Laboratory at the Patuxent Wildlife Research Center, and follow the directions. Provide the exact location and date of your sighting as well as your name and contact information. You will receive a certificate of appreciation in return.

You can also send the date and exact location by e-mail to stuart.houston@usask.ca or vulturesociety@gmail.com. If you don't have access to e-mail, and only if you have a tag number to report, call the Canadian Wildlife Service, Ottawa, collect: 1 (613) 990-1698.

Birders in Saskatchewan are encouraged to check every deserted farm building after July 1, when young have hatched and parents are unlikely to desert them. Look in the basement, attic, and clothes closets, smell for rotting food, and listen for a loud steam-engine hiss. Please report nesting vultures to the author.

Acopian Director of Conservation Science at Hawk Mountain Sanctuary in Pennsylvania, and the Sarkis Acopian Fund. The devices record locations to 10-meter (32-foot) accuracy every one to three hours. Both southward and northward migrations take place almost exclusively on sunny days. The birds soar effortlessly in thermals to Venezuela or southern Colombia beyond La Paz. On cloudy or rainy days, about one day in three, vultures take the day off.

When calculations include the days spent on the ground, the birds average only three (but up to eight) hours of flight per day, covering an unexpectedly low 70-80 kilometers (43-50 miles) on an average day. The usual speed, riding the thermals, is about 30 kilometers an hour (19 mph), but birds can reach 70 kph with a tailwind. Adults leave Saskatchewan in the last week of September and the first week of October. They arrive at their wintering grounds anywhere between November 2 and January 15 but leave more consistently, between March 14 and March 29.



SQUATTER: A tagged adult watches over brown-speckled eggs under the rafters of a farm house. An antenna extends from the transmitter on the vulture's back.

Brent Terry

“The birds deposit two eggs, two days apart, on the floor of a cave or on plywood, linoleum, cement — and, once, on a mattress on the floor of a deserted house.”

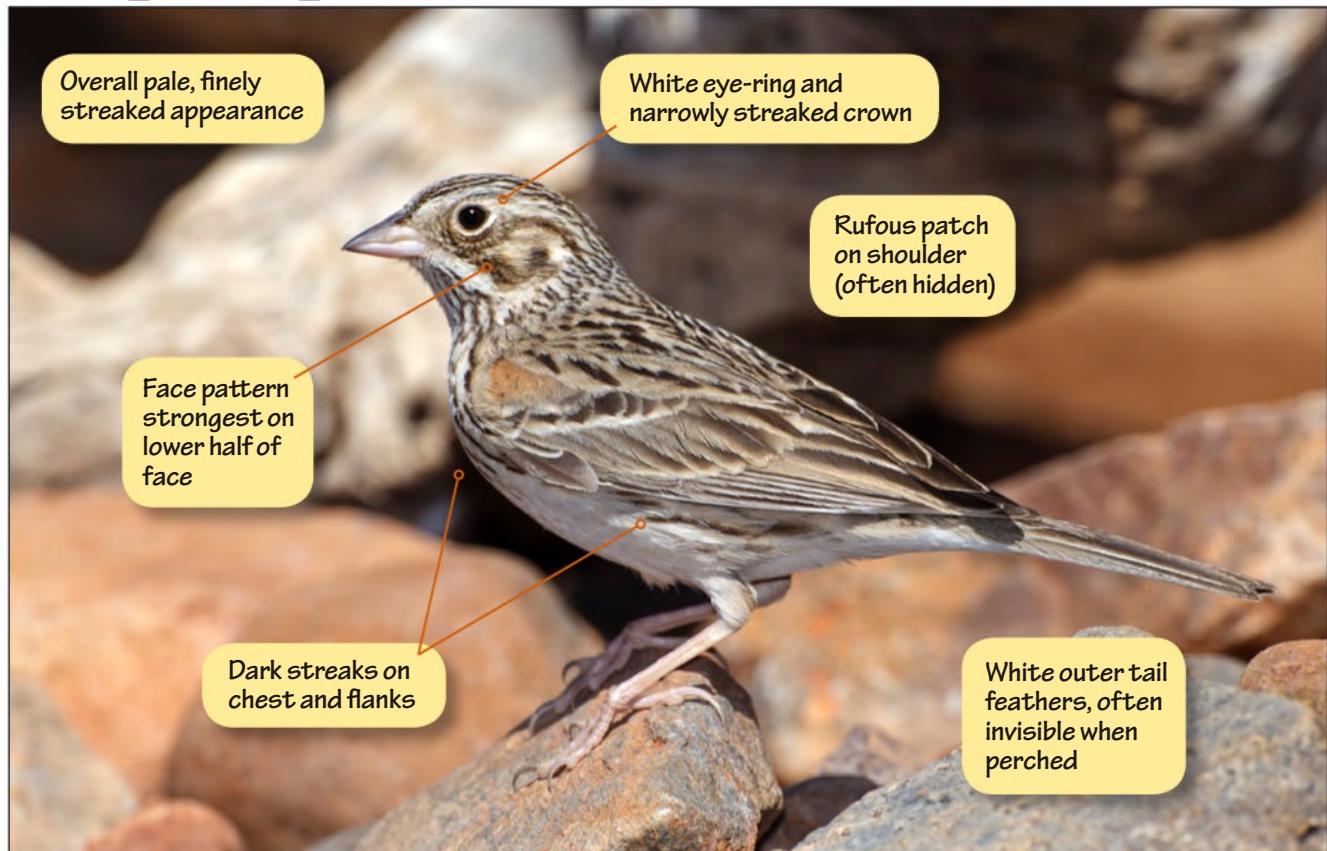
In Venezuela our vultures wander distances to feed; their winter ranges are larger than their summer breeding ranges in Saskatchewan. A vulture known as T2 had its hourly visits plotted for four consecutive winters. It spent over half the nights (73, 77, 61, and 92 nights) at the same primary nocturnal roost, near the southern edge of its 4,775-square-kilometer (1,843-square-mile) winter range. When at that site, it would stay for 12 to 19 hours. Other days were spent wandering far afield in search of food.

In summary, the co-operative nature of numerous Saskatchewan farmers has gained us access to every reported nest. Marten J. Stoffel, Harold Fisher, Mike Blom, and Jared Clark applied the wing tags. Future studies will look for

differences in movement distances between males and females, and we hope to discover more tagged birds raising young in 2015 and 2016, still a disappointingly small number.

C. Stuart Houston is a retired radiologist, historian, and recipient of the Saskatchewan Order of Merit and Officer of the Order of Canada. He has banded more than 150,000 birds of 211 species since 1943. In an article in our December 2005 issue, he described a leucistic Great Gray Owl discovered in eastern Saskatchewan during the 2004-05 owl irruption. Photographer Brent Terry is a recently retired custodian with the Saskatoon Public School Board at Hugh Cairns V.C. School.

Vesper Sparrow



Vesper Sparrow, adult April in Pima County, Arizona

What to look for

Context. Mostly in open, dry fields. Outside of breeding season, often in small, loose flocks.

Size and shape. A fairly large, bulky sparrow with a medium-length tail.

Overall appearance. Pale gray-brown, with extensive fine, dark streaking.

Crown. Less pattern than on most sparrows, with fine streaks showing little contrast.

Face. Conspicuous eye-ring, brown cheek patch with dark edge and pale outline.

Tail. White outer feathers, often hard to see except in flight.

Wing. Small rufous patch on shoulder, often hidden by body feathers.

When identifying sparrows, it's better to start with habitat than with field marks. Migrating birds sometimes pause in odd habitats, but the majority of the time, a sparrow's surroundings will provide a chief clue to its identity.

Vesper Sparrow, widespread in North America, is a bird of wide-open habitats: dry grassland, edges of farm fields, semi-desert areas. It avoids forests, dense thickets, damp meadows, and areas of tall, rank grass, as well as extreme desert areas, all of which are prime habitats for other kinds of sparrows.

Behavior within the habitat, including social behavior, makes up another significant part of a sparrow's overall character. Outside of breeding season, some sparrows of open country, such as Grasshopper and Baird's Sparrows, are intensely solitary and elusive, hiding in

"The vast majority of the time, a sparrow's surroundings will provide a chief clue to its identity."

whatever cover is available. Others, such as Brewer's Sparrow, are quite sociable, appearing often in good-sized flocks and perching in the open. Vesper Sparrow falls between these extremes. During migration and winter, it typically occurs in small flocks, with perhaps half a dozen individuals in a loose association. When disturbed, the birds may perch on bushes or fence wires, where they are easy to see.

I often recommend breaking down the sparrows by genus to put similar species together. Vesper Sparrow is classified in a genus by itself, *Pooecetes*, with no close relatives. Larger and bulkier than most sparrows, with a medium-length tail and fairly sharp call notes, it doesn't seem similar to other members of the family, although in size and habitat it may suggest Lark Sparrow. But for the practiced observer, the general character of Vesper Sparrow should seem distinctive.

White outer tail feathers and a reddish brown patch on the shoulder provide Vesper Sparrow's most famous field marks — but not the most helpful. The outer tail feathers can be hard to see when the bird is perched, and the lesser coverts on the bend of the wing are often tucked out of sight. It's better to base the ID on other things, and then use the well-known marks for confirmation.

Among field marks based on plumage, the best are all on the head. Unlike most sparrows, Vesper shows a strong pattern mostly on the lower half of its face. A dark line surrounds the bottom of the cheek patch, and a pale line surrounds that, leading to a whitish spot at the back of the face. A white eye-ring is usually conspicuous, but the crown and the vague eyebrow are marked only with fine streaks. The pattern is easier to see than it is to describe, but with practice, it can be recognized at a glance.

Kenn Kaufman is co-author of *Kaufman Field Guide to Nature of the Midwest* and author of *Kaufman Field Guide to Advanced Birding* and other books. Brian E. Small (www.BrianSmallPhoto.com) is a professional nature photographer who lives in Los Angeles.



Vesper Sparrow, adult June in York County, Maine

Compare this Vesper Sparrow to the one shown on the facing page. There are slight geographic variations, but season and the amount of wear on the plumage account for essentially all the differences. Vesper Sparrows go through a complete molt in late summer and early fall. In fall, winter, and early spring, their plumage looks fresh.

But by summer, on the nesting grounds, abrasion and wear start to make the plumage patterns less distinct. We can still see basic points, such as the overall bulky shape, the white eye-ring, and the pattern on the lower half of the face. As usual when the bird is perched, the white outer tail feathers are barely visible.



Savannah Sparrow, adult May in Kern County, California

Savannah Sparrow is a smaller, shorter-tailed bird than Vesper Sparrow, but it's often found in the same habitats, and it's similar in behavior, too: Outside of breeding season, Savannahs are often seen in small, loose flocks, and they often perch in the open. What makes ID tricky is that they often have pale outer tail feathers; when visible on birds

in flight, the pattern may suggest Vesper Sparrow. On the perched bird, note that Savannah Sparrow has darker stripes on the side of the crown (setting off a narrow white median stripe) and lacks the obvious eye-ring. Many Savannahs also show yellow lores, but this mark isn't consistent enough to be diagnostic for ID.



Vesper Sparrow, adult June in York County, Maine

A song of whistles and trills, commonly heard in open country, gave Vesper Sparrow its name. (See sidebar at right.) The bird was once called Bay-winged Bunting for the touch of rufous on its shoulder, partly visible in this photo. But that color, restricted to the lesser coverts, is often hidden, since the bend of the wing is often tucked under the

body feathers of the scapulars and breast. More reliable for ID are elements of the face pattern, including the dark line surrounding the lower part of the cheeks, and the conspicuous pale spot just behind this area. Aside from the white eye-ring, the upper part of the face looks relatively plain, without strongly contrasting marks.



Henslow's Sparrow, adult May in Muskingum County, Ohio

Most sparrows of open, grassy habitats have at least some streaking on the underparts, perhaps as a part of overall camouflage. Other aspects of their appearance are more important for separating the species. Henslow's Sparrow is a good representative of the genus *Ammodramus*, a group of big-headed, short-tailed, short-winged sparrows of dense low cover. Shape alone should

be enough to separate them from Vesper Sparrow. Behavior helps also, since *Ammodramus* sparrows are much more elusive and solitary. For field marks involving plumage, it's best to look at the pattern and color of the head and back. All of the sparrows in the group have stronger patterns on the crown than Vesper Sparrow, and most have more varied head colors.

What's in a name?

Does Vesper Sparrow sing more fervently in the evening than most birds? A few 19th-century naturalists thought so, and that explains its current English name.

Publications from the early 1800s call the bird Bay-winged Bunting or Grass Finch. But in an 1858 essay in *The Atlantic Monthly*, a naturalist named Wilson Flagg wrote that the sparrows sang in the evening “with still greater zeal than they chanted in the morning.” Flagg had met people who called the sparrow “the Vesper-bird... from its evening hymn, or vespers.” He liked the name so much that he thought it should apply everywhere.

The novel name might have been forgotten except that it caught the attention of John Burroughs, who was just beginning a career that would make him America's most famous nature writer. In an 1865 essay in *The Atlantic Monthly*, he wrote of the bird: “His song is most noticeable after sun-down, when other birds are silent; for which reason he has been aptly called the vesper sparrow.” Burroughs repeated the same point in his book *Wake-Robin*, in 1871, this time with a nod to Flagg as the source of the name.

Burroughs's popularity and influence grew rapidly. When the American Ornithologists' Union published its first checklist, in 1886, standardizing the English names of North American birds for the first time, it called the bird Vesper Sparrow without question, and that has been its name ever since. 

hotspotsnearyou



HOTSPOTS 217-220



no. 217 hawk cliff hawk watch
elgin county, ontario

no. 218 franklin mountain hawk watch
davenport, new york

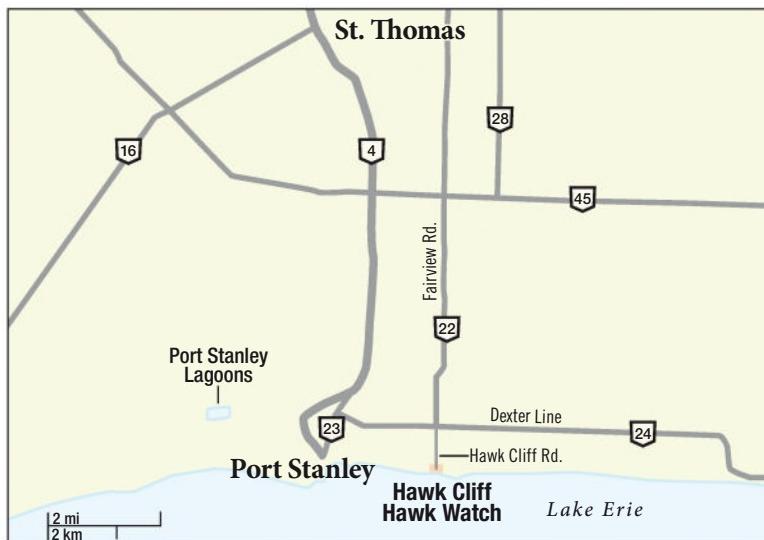
no. 219 hitchcock nature center
honey creek, iowa

no. 220 chelan ridge hawk watch
pateros, washington

JERRY LIGUORI is a raptor expert, an educator for HawkWatch International, and the author or co-author of three good books: *Hawks from Every Angle*, *Hawks at a Distance*, and *The Crossley ID Guide: Raptors*. In our October 2014 issue, he described the spectacular hawk-, eagle-, and condor-watching you can do on the South Rim of the Grand Canyon (Yaki and Lipan Points, Hotspot Near You No. 196). In this issue, he writes about another picturesque hawk watch: Chelan Ridge, in Washington State (above). He says the site has averaged about 1,400 raptors in each of the last five years, it's good for northwestern specialties such as the Black Merlin, and it's home to an annual hawk-migration festival. You can find his report, and three others, on the following pages. — Matt Mendenhall

hawk cliff hawk watch

elgin county, ontario
42°39'50.63"N 81°10'12.70"W



The Hawk Cliff Hawk Watch is located just east of Port Stanley, near the midpoint of the north shore of Lake Erie. From St. Thomas, take Fairview Rd. (Cty. Rd. 22) south for 7.1 miles (11.5 km) to Dexter Line. Continue south as the road becomes Hawk Cliff Rd. and the surface changes to gravel. Go 0.75 miles (1.2 km) to the viewing area.

I've been making the trek to Hawk Cliff for almost 30 years. I usually try to arrive early, before the raptors are in the air, to look for migrant songbirds. A wonderful, large mulberry tree near the main observation area is often filled with warblers, Cedar Waxwings, Baltimore Orioles, and other species.

As the morning progresses, I'll first see raptors that tend to move early: Merlins, Sharp-shinned Hawks, American Kestrels, and low-flying Northern Harriers. By mid-morning, the larger buteos catch building thermals, soaring upward before heading off to the west.

The place to watch for hawks is a knoll that is just steps from the parking area. On a mid-September day in 2000, I witnessed the passage of more than 131,000 raptors, mostly Broad-winged Hawks. I'll never forget the sight of kettle after kettle boiling up into the sky. In late October 2011, I was treated to incredible views of 68 Golden Eagles passing overhead.

The best days have moderate-to-strong north, northwest, or northeast winds with a good buildup of cumulus clouds. On any given day, expect to see as many as 15 different raptor species; typical daily totals reach several hundred to a few thousand birds. — *Dave Brown*

Dave Brown is the official counter at the Hawk Cliff Hawk Watch and is its liaison to the Hawk Migration Association of North America.

AT A GLANCE

HABITAT

Cliffs overlooking Lake Erie, patches of Carolinian forest, agricultural fields, tree lines.

TERRAIN

Mostly flat. Wheelchair-accessible, depending on condition of ground.

BIRDS

More than 200 species. Osprey, Bald Eagle, Northern Harrier, Sharp-shinned, Cooper's, Red-shouldered, Broad-winged, Red-tailed, and Rough-legged Hawks, Northern Goshawk, Golden Eagle, American Kestrel, Merlin, Peregrine Falcon, Gyrfalcon (rare), Mississippi Kite (rare), Swainson's Hawk (uncommon), Tundra Swan, Pileated Woodpecker, Yellow-bellied Sapsucker, Yellow- and Black-billed Cuckoos, Townsend's Solitaire (uncommon), Northern Mockingbird, White-eyed Vireo (uncommon), Cape May, Bay-breasted, and Prairie Warblers, Scarlet Tanager.

WHEN TO GO

September to December for raptors.

September and early October for songbirds.

AMENITIES

Portable restrooms. Live-raptor talks on two weekends in mid-September. Volunteers usually on site to assist in spotting and identifying birds.

ACCESS

Operated by non-profit Hawk Cliff Hawk Watch and St. Thomas Field Naturalists. Open 7-4 most days, September through November. No fees. Land around hawk watch is private; visitors have access only to east side of property and only along inside edge of landowner's field. Parking area is alongside observation knoll.

TIPS

Bring binoculars, scope, folding chair, layers of clothing, hat, gloves, and food and drink.

FOR MORE INFO

Hawk Cliff Hawk Watch, www.ezlink.ca/~thebrowns/HawkCliff/index.htm.

St. Thomas Field Naturalist Club, <https://stfnaturalist.wordpress.com>.

www.BirdWatchingDaily.com/hotspotsmap

AT A GLANCE

HABITAT

Grassy meadow. Sanctuary also includes wetlands, grasslands, and deciduous forests.

TERRAIN

A grassy path up a short but steep hill leads to the hawk watch.

BIRDS

Turkey Vulture, Osprey, Bald and Golden Eagles, Northern Harrier, Sharp-shinned, Cooper's, Red-shouldered, Broad-winged, Red-tailed, and Rough-legged Hawks, Northern Goshawk, American Kestrel, Merlin, Peregrine Falcon. (Seasonal totals posted on website.) Large flocks of Canada Goose and Snow Goose, plus American Crow, Common Raven. Pileated Woodpecker, Northern Flicker, Eastern Kingbird, Red- and White-breasted Nuthatches, Wood Thrush, Ovenbird, Common Yellowthroat, Yellow, Canada, and other warblers, sparrows, buntings, finches.

WHEN TO GO

Autumn for raptors. Spring through autumn for migrant and nesting songbirds.

AMENITIES

Rustic. A few benches and a small hut. Outhouse near barn. Hiking trails. Experienced, friendly volunteer counters present most days, mid-August through January 1. Open house at sanctuary September 26 from 10-2 will feature hawk-ID workshop and live-raptor presentation. Downloadable checklist on Delaware-Otsego Audubon Society website.

ACCESS

Delaware-Otsego Audubon Society sanctuary. Open year-round. No fees.

TIPS

Wear warm clothes, especially after September. Bring binoculars and a spotting scope, though some are available on site.

FOR MORE INFO

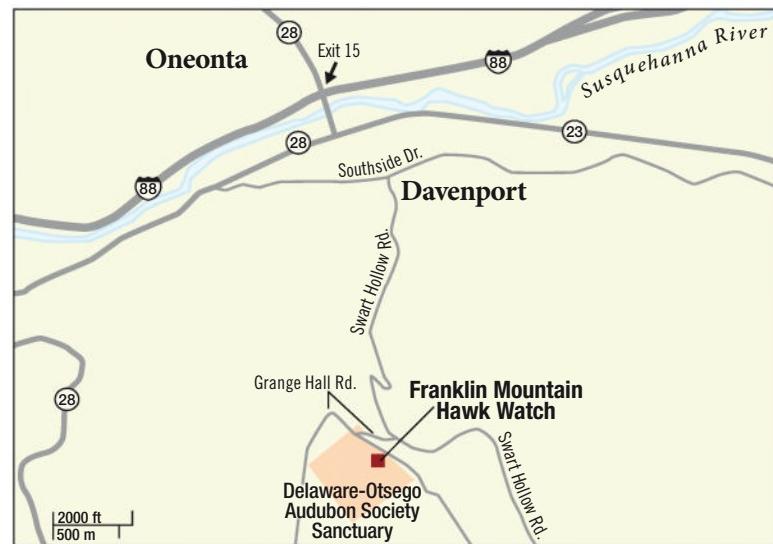
Franklin Mountain Hawk Watch, <http://doas.us/research/franklin-mountain-hawkwatch/>.
Delaware-Otsego Audubon Society, www.doas.us. New York State Ornithological Association, www.nybirds.org.

www.BirdWatchingDaily.com/hotspotsmap

franklin mountain hawk watch

davenport, new york

42°25'31.4"N 75°2'49.0"W



The Franklin Mountain Hawk Hatch is within the Delaware-Otsego Audubon Society Sanctuary, south of Oneonta. From I-88, take exit 15 onto southbound Rt. 28. Take a right on Rt. 28/23, go to Southside Dr., and turn left. At Swart Hollow Rd., turn right, and after 1.5 miles, make a sharp right onto Grange Hall Rd. Park in the lot at the top of the hill.

This hawk watch provides a spectacular panoramic view of the Susquehanna River Valley and the surrounding hills of Otsego and Delaware Counties in central New York State. A project of the Delaware-Otsego Audubon Society, the watch was created more than 25 years ago as a scientific survey of the fall raptor migration.

I especially like to visit Franklin Mountain on warm sunny days in late September, when Sharp-shinned Hawks can pop up over the ridge, and kettles of Broad-winged Hawks may be swirling above.

Sometimes, the Broad-wings are so high overhead that they're invisible to the naked eye; only binoculars reveal their presence.

Brisk days in October and early November can bring large flights of Red-tailed Hawks interspersed with Red-shouldered Hawks and Bald Eagles. In November and December, the mountain is one of the premier sites on the Eastern Flyway for viewing Golden Eagles.

I remember particularly one sunny December morning, when a Golden appeared as just a speck in a spotting scope and approached steadily until it flew so low above me that I could see its yellow feet and talons without binoculars. — Charlie Scheim

sites nearby

Tablet readers: Tap the links to read more about each site.

Robert V. Riddell State Park

About nine miles from hawk watch off Hwy. 28. More than 1,000 acres of woodlands and fields. Kingfishers, woodpeckers, and Ruffed Grouse.

Betty and Wilbur Davis State Park

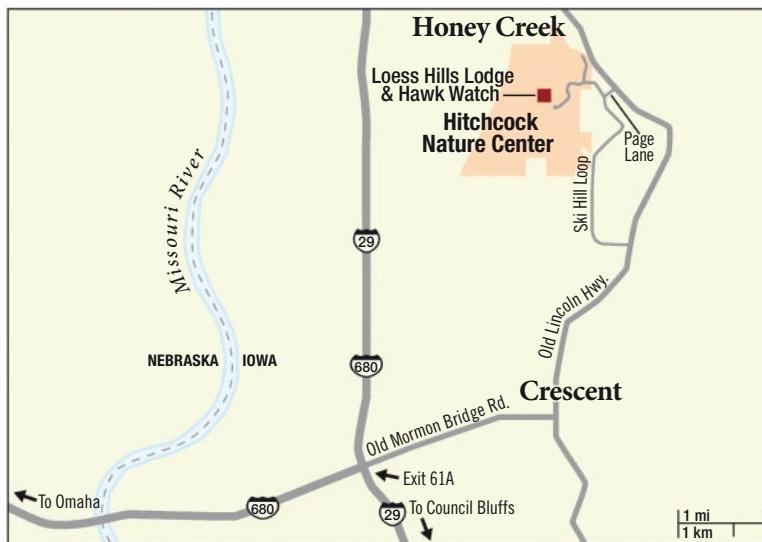
About 35 miles from hawk watch off County Rd. 36A. Hardwoods, conifers, and meadowlands on 229 acres.

Charlie Scheim is a mathematics professor at Hartwick College, in Oneonta. He has been a counter at Franklin Mountain.

hitchcock nature center

honey creek, iowa

41°24'48.76"N 95°51'31.93"W



Hitchcock Nature Center includes 1,268 acres in western Iowa's globally significant Loess Hills. From Council Bluffs, take I-29 to exit 61A and head east on Old Mormon Bridge Rd. Drive two miles into Crescent and turn left on Old Lincoln Hwy. Follow it to Page Lane, turn left, go to Ski Hill Loop, turn right, and continue to the parking area.

Birders in the Great Plains know Hitchcock Nature Center for its excellent fall raptor flights. To the west, Iowa's Loess Hills tower hundreds of feet above the nearly flat valley floor, reaching a height of 1,400 feet above sea level. A nearly unique land formation in North America, the hills are composed of soils deposited long ago on the eastern side of the Missouri River Valley by prevailing westerly winds. The topography and winds create conditions perfect for migrating raptors.

We hawk watchers count about 11,000 individuals of 18-20 species annually. North or northwest winds are generally best, but during the prime period, between September 20 and October 20, good flights can occur during a broad spectrum of conditions. Many other species, including Red-headed Woodpecker, Blue Jay, American White Pelican, and Snow Goose, can be seen migrating (at times in huge numbers) along with the raptors. While the fall flights are Hitchcock's main attraction, the property and surrounding areas have much else to offer. Spring brings migrant songbirds, and in summer, approximately 100 species, including Lark Sparrow, Black-billed Cuckoo, and Blue Grosbeak, breed around the nature center. — *Mark Orsag*

Mark Orsag is a professor of history at Doane College, in Crete, Nebraska. He is the official counter at the Hitchcock Nature Center Hawk Watch.

AT A GLANCE

HABITAT

Prairie remnants, forest, and bur oak savanna.

TERRAIN

Trails vary from easy walks to difficult climbs.

BIRDS

More than 300 species. Fall raptors: Turkey Vulture, Osprey, Bald Eagle, Northern Harrier, Sharp-shinned, Cooper's, Broad-winged, Swainson's, and Red-tailed Hawks, Peregrine Falcon, and American Kestrel. American White Pelican, Double-crested Cormorant, Snow Goose, Franklin's and Ring-billed Gulls, Red-headed Woodpecker, Blue Jay, American Crow, American Robin, Purple Martin, swallows, and blackbirds. Summer: Indigo Bunting, Baltimore Oriole, Rose-breasted Grosbeak, Bobolink, and Scarlet Tanager.

WHEN TO GO

Late September through early November for hawks. Bald Eagle peaks mid-November through early December. Passerine migration best in May and September.

AMENITIES

Loess Hills Lodge has exhibits and trail maps. Fifty-foot hawk-watch tower adjacent to lodge, wheelchair-accessible observation decks, and boardwalk trail. Raptor- and owl-banding program (in season).

ACCESS

County park. Open 6-10 daily. Admission \$2 per vehicle per day or \$10 for annual permit. Hawk watch run by the Pottawattamie County Conservation Board and the Hitchcock Hawkwatch Association.

TIPS

It is much colder atop the tower than most people think it will be. Dress warm and in layers! Park trails can be surprisingly steep and demanding. If you hike the trails in spring or fall, bring bug spray.

FOR MORE INFO

Hitchcock Nature Center, (712) 545-3283, www.pottcoconservation.com/parks-and-habitat-areas/hitchcock-nature-center. Iowa Ornithologists' Union, www.iowabirds.org.

www.BirdWatchingDaily.com/hotspotsmap

AT A GLANCE

HABITAT

Evergreen forest, mountains, and grassy, brushy hillsides.

TERRAIN

Relatively flat along the ridge. Trail from parking lot to hawk watch is a moderate grade but not wheelchair-accessible.

BIRDS

17 raptor species, including Golden Eagle, Prairie Falcon, Osprey, Sharp-shinned, Cooper's, Red-tailed, Swainson's, and Broad-winged Hawks, Northern Harrier, and American Kestrel. Pine Siskin, Oregon Dark-eyed Junco, sapsuckers and woodpeckers, Gray and Steller's Jays, Clark's Nutcracker, Mountain Chickadee, Mountain and Western Bluebirds, warblers, Western Tanager, Black-headed Grosbeak, Lazuli Bunting. Accidental: Red-shouldered and Ferruginous Hawks, American Pipit, Long-tailed Jaeger, Northern Hawk Owl.

WHEN TO GO

Autumn. Best from 10 a.m. to 3 p.m. Accipiters may fly at first light, and falcons, Northern Harrier, and Osprey can be seen near dusk.

AMENITIES

Chelan Ridge Hawk Migration Festival held in Pateros each year in mid-September; this year it's on September 12. Tally board for hawk count at parking lot. HawkWatch International educator on site daily from August 23 to mid-October. Portable toilet in parking lot.

ACCESS

National forest. No fees. Open to the public. A four-wheel-drive vehicle is best, but cars and vans OK. Camping near parking lot. Hike to the hawk watch takes about 20 minutes.

TIPS

Bring sunscreen, water, food, binoculars (spotting scope not necessary), camera, and visor or baseball hat. Winter hat, gloves, and jacket may be necessary in October.

FOR MORE INFO

Okanogan-Wenatchee National Forest, www.fs.usda.gov/okawen. HawkWatch International, www.hawkwatch.org.

www.BirdWatchingDaily.com/hotspotsmap

chelan ridge hawk watch

pateros, washington

48°1'12.8"N 120°5'38.4"W



The Chelan Ridge Hawk Watch overlooks the Okanogan-Wenatchee National Forest, in central Washington. From Pateros, take Rt. 153 north for six miles and turn left on Black Canyon Rd. (NF 4010). Drive nine miles to NF 8020, turn left, and drive three miles to the parking area. Hike about 0.75 miles west along flagged trail to the watch site.

sites nearby

Tablet readers: Tap the links to read more about each site.

Slate Peak

About two hours north of Chelan Ridge along Hart's Pass. The highest place in Washington accessible by car. Peak offers topside views of birds that fly below eye-level.

Lake Chelan and Columbia River

South of Chelan Ridge off Hwy. 97. Nesting Osprey, and lots of open areas for shoreline birding.

During my last visit, I was rewarded with a picture-perfect view of a Black Merlin as it made several passes at a plastic owl decoy. My target bird at the ridge is Harlan's Red-tail. The Harlan's race is widespread and easily seen in winter in much of the West, but it's more difficult to see on migration, so spotting it is an exciting treat.

HawkWatch International and the Okanogan-Wenatchee National Forest count about 1,400 migrants of up to 17 species each year from late August to late October, weather depending. Raptor banding also takes place, and HawkWatch has outfitted Red-tailed Hawks and Golden Eagles at the site with satellite transmitters to provide information about migration patterns and wintering grounds. The forest along Black Canyon Rd. that leads to the lookout offers great birding; watch for grouse, Varied Thrush, Northern Goshawk, and other woodland species. — Jerry Liguori

Jerry Liguori is an educator for HawkWatch International and the author or co-author of three books about raptors.



Illustration by Denise Takahashi

THE BEE'S KNEES: When a loon paddles underwater, the cnemial crest functions as a lever.

Grace under water

The adaptions that let birds dive and swim below the waves

As birds diverged from their early ancestors, many exploited aquatic habitats by wading or swimming. Others took to diving.

Diving creates a problem for birds: They need a continuous supply of oxygen and must get rid of carbon dioxide, but diving requires breathing to stop. This would appear to be a paradox — but don't sell birds short.

For starters, divers have greater blood volume and store more oxygen, as oxyhemoglobin in blood and oxymyoglobin in muscle, than non-divers. Tufted Ducks, for example, have 70 percent more oxygen per kilogram of body

weight than Mallards. Carbon-dioxide buildup stimulates birds to breathe and can ultimately force breathing — death for a diver. To counter this problem, divers have a better buffering system that allows them to accumulate more carbon dioxide before breathing.

About six seconds into a dive, a reflex causes general metabolism to decrease. The heart rate slows by about 50 percent, and blood is shunted from the skin, viscera, and musculature — body parts that can tolerate limited oxygen — to the heart and brain, which require a constant supply. The actions help conserve a limited oxygen supply. If required, rapid

"Loons are among the best divers. They have reached depths of 180 feet and stayed underwater for 15 minutes."

muscular activity can be accomplished anaerobically. Lactic acid that builds up will be removed metabolically after oxygen is restored.

Plunge divers, such as terns, kingfishers, and gannets, spot fish from the air and dive into the water headfirst, sometimes from great distances. If the plunges are successful, the birds catch the fish in their bills. If they miss, they swim quickly to the surface and swallow only their pride.

Pursuit divers chase fish underwater. Because their hips are narrow and their body is cylindrical, they move efficiently through the water. Their legs are placed far back on their body, where they function as propellers and rudders. The best examples of pursuit divers are loons and penguins.

Another problem for diving and underwater swimming is that, during the early evolution of birds, natural selection favored low weight and high buoyancy. Such traits are good for most lifestyles but costly to divers, which want to devote their energy to pursuing prey, not to counteracting buoyancy. So they want to be heavy.

Divers are heavier than non-divers because their long bones are filled with marrow, their muscle mass is greater (especially in the legs), and most have heavier plumages, which they make waterproof with oil from their enlarged uropygial, or preen, gland.

Other adaptations for divers are smaller wings, laterally compressed lower legs, larger feet, and toes that collapse on the return stroke. Each reduces friction with the water. Sometimes the adaptations create tradeoffs.

Consider dabbling and diving ducks. Dabblers, such as pintails and teal, spring directly into the air, while divers, such as scaup and goldeneyes, have to run on the water to gain enough ground speed for

lift. Divers' small wings are an advantage for diving and underwater swimming, but they are a detriment to flight because the heavy wing loading forces the birds to make many more rapid, energy-expending wing beats.

Legs like oars

Loons are among the best divers. Most of their dives are shallow, but they have reached depths of 180 feet and stayed underwater for 15 minutes. Two of their adaptations are unique to birds. When swimming, they do not suspend their legs under the body. Rather, they extend them laterally, like oars. This arrangement makes steering easy and allows for maximum thrust without interference from the turbulence created by the other foot.

Unlike other birds, the lower leg of loons has an elongate process that extends prominently above the knee. (See illustration.) Called the *cnemial*

crest, the ridge expands the surface area to which the large thigh muscles attach, increasing leverage and giving loons powerful leg extension.

Of all birds, penguins are the most perfectly adapted for a swimming-and-diving lifestyle. Their bodies are smooth and streamlined, and their layered, hair-like feathers are continuous over the entire body. Feathers on other birds are arranged in tracts.

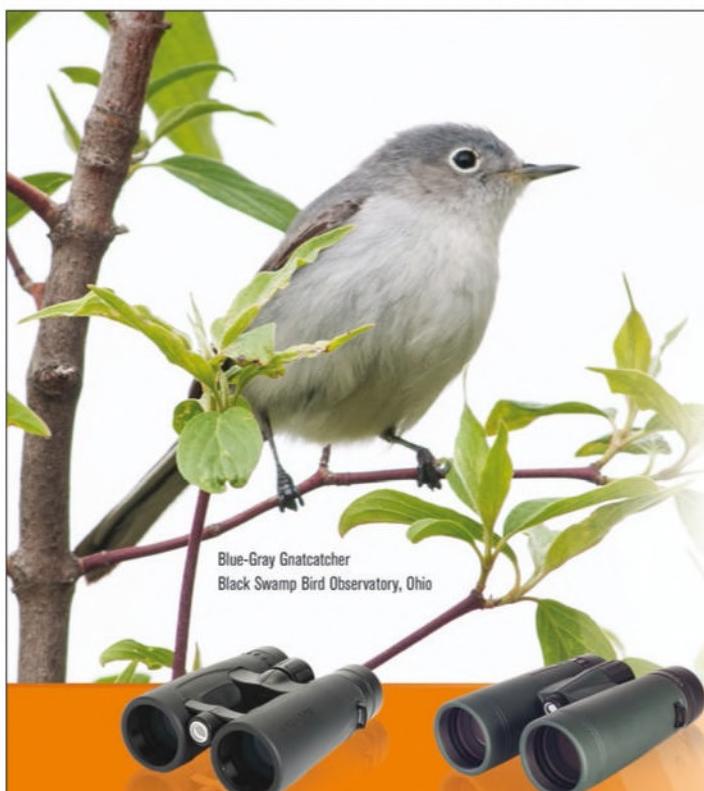
Penguin wings are small, flat flippers, and the wing joints are immovable. The birds literally fly through the water. The legs are attached at the end of the body. The birds use them as rudders for steering. Penguins have a thick layer of subcutaneous fat that provides great insulation, and they are known to swallow pebbles, presumably to serve as ballast that would make diving and swimming more efficient.

While most penguin dives are short and fairly shallow, Emperor Penguins

have been observed underwater for 23 minutes and at depths of more than 1,800 feet. During such dives, their heart rates can decrease to five beats per minute. This is an enigma. Scientists have not figured out how Emperor Penguins can survive events such as these, when oxygen partial pressure would seem too low to combine with hemoglobin, and blood flow is too slow to prevent tissue death. Yet, somehow, the penguins make it work.

The ability of birds to dive and swim gracefully underwater, and to cheat death by not breathing, is an additional example of their amazing behavior. 

Eldon Greij is professor emeritus at Hope College, located in Holland, Michigan, where he taught ornithology and ecology for many years. He is the founding editor of *Birder's World* magazine. You can find an archive of his "Amazing Birds" columns on our website at BirdWatchingDaily.com.



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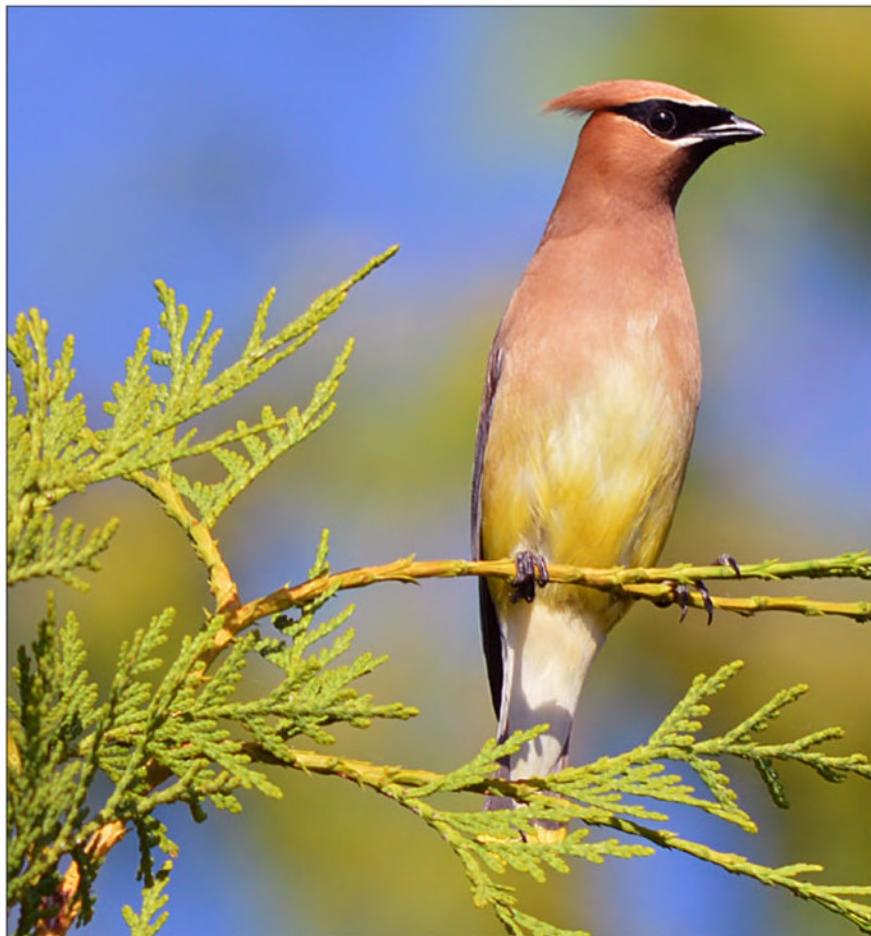
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Kyle MacEachern

ZEN-LIKE: A Cedar Waxwing keeps watch for insects at Luther Marsh, northwest of Toronto.

At its own pace

Well into fall, Cedar Waxwing remains in summer mode

Late every summer and into the fall, when I'm ambling down a country road in northern Wisconsin, watching raptors at Duluth's Hawk Ridge, birding along Lake Superior, or sitting in my backyard, I'm drawn to Cedar Waxwings.

Many sit on bare branches rising above leafy trees. Now and then, one flutters out to snatch a flying insect but, even then, takes its time about it.

Waxwing flight looks unhurried, and the sibilant calls ("like tiny mice snoring," explained an ornithology professor) contribute to the Zen-like peacefulness that washes over me whenever they're near. Even migrating flocks appear not to

rush. Birds continually change position, so the flock seems to swirl gently as it moseys along. As you and I start the school year, Cedar Waxwings remain in the lazy, hazy mode of summer vacation.

Except when individuals dart out and back after an insect, they mostly sit still, as if conserving energy is their highest priority. Waxwings are easy to recognize by their crested head, erect posture, and soft demeanor.

Berry bushes and fruit trees also harbor waxwings. We can often approach close to a flock in fruit-eating mode. The young of the year still have streaked breasts and bellies, and their

TABLET EXTRAS

Tap the links below to read more by Laura Erickson.

DOGGED LISTING

The pleasures of finding life birds for a new puppy.

BULLIES AND MAVERICKS

Simple chickadees observe a complex social hierarchy.

No tablet? Find a link to all Tablet Extras at [www.BirdWatchingDaily.com/
the-magazine/current-issue](http://www.BirdWatchingDaily.com/the-magazine/current-issue)

secondary feathers lack the red waxy tips that give the species its name. Developing them doesn't seem all that urgent; each bird grows them at its own pace.

Few people leave snags and dead branches alone in their backyards, and even when we do, we can't guarantee that waxwings will show up. Planting fruiting trees and shrubs may draw the birds to our yards. Birdbaths, especially models that look like natural water features, can also work.

Unfortunately, what goes in also comes out. Waxwing droppings frequently contain the seeds of exotic invasive plants. As fast as land stewards can remove buckthorn, for example, Cedar Waxwings replant it, with help from robins and other fruit-eaters. Too bad we can't explain to them that the shrub crowds out native plants that are more nutritious and provide food over a wider part of the annual cycle.

The other problem associated with fruit-eating birds begins when sugars in the fruit ferment. Waxwings can become intoxicated. They do have a sense of smell and may detect the odors of fermented berries. Unfortunately, during freezing conditions, fermented berries don't exude many smells; that's when waxwings start having difficulties. While intoxicated, they grow disoriented and lose muscular coordination. Since they often collide with windows and cars, it's best to plant fruiting plants away from windows and roads.

It's the least we can do, it seems to me, considering the contentment and peacefulness that these quietly convivial, lackadaisical birds inspire. ↗

Laura Erickson is co-author of *Into the Nest: Intimate Views of the Courting, Parenting and Family Lives of Birds*. Last year she won the American Birding Association's highest honor, the Roger Tory Peterson Award.

Homemaker



▲ **NESTING TIME:** A banded Atlantic Puffin carries nest materials among other puffins and Razorbills on Machias Seal Island, in the Gulf of Maine. John A. Eastman, of Arlington, Texas, took the photo in June with a Panasonic Lumix DMC-ZS20.

► **MISSED IT:** A Cedar Waxwing watches a juniper berry drop from a branch at Pinery Provincial Park, near Grand Bend, Ontario. Suzanne Southon, of London, Ontario, used a Nikon D300S and Sigma 150-500mm lens.

▼ **OPEN WIDE:** An immature Yellow-crowned Night-Heron clutches a crab at J.N. "Ding" Darling National Wildlife Refuge, in Florida. Cathy Harman, of Roswell, Georgia, says the bird struggled for a while but eventually swallowed its prey. She used a Canon EOS Rebel SL1 with a 55-250mm lens.





BONDING RITES:

Critically endangered Waved Albatrosses call to each other on Española Island, one of the Galápagos. The birds also clacked their bills and pointed them skyward. Tina Trice, of Sandston, Virginia, shot the photo in June with a Sony Cyber-shot DSC-HX300.



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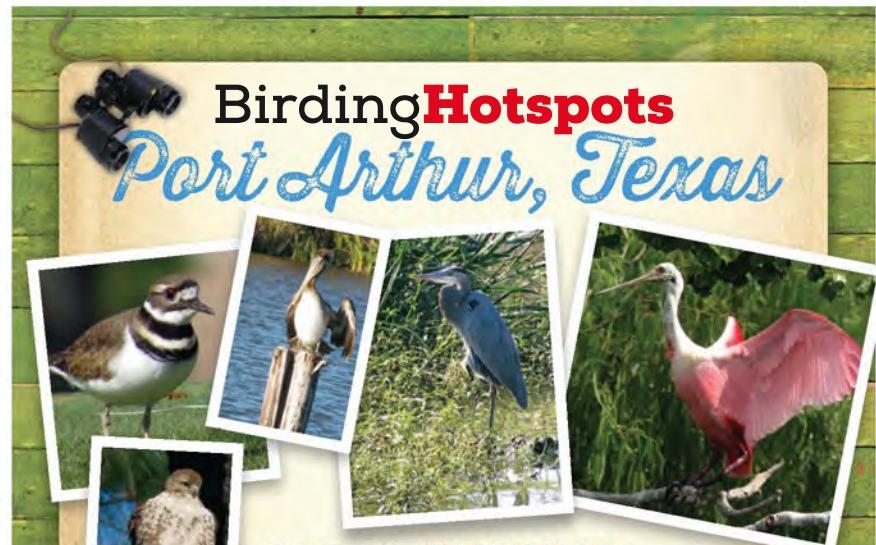
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► **FACEOFF:** A Pileated Woodpecker keeps an eye on a Northern Flicker in Graham Ford's backyard in Nanaimo, British Columbia. He used a Canon PowerShot SX 60HS.



► **NIGHT FLYER:** Charles Gangas spotted this red-morph Whiskered Screech-Owl on La Bufa, a mountain in Jalisco, in western Mexico. He shot the photo in early March with a Nikon D810 and Nikkor 500mm lens.

Let's hear from you!

Submit photos as full-resolution, high-quality JPG files via email (no TIFFS, please). Include a short description of the photo: the bird name, the equipment used, and the location. Please include your name, address, phone number, and email address. If we publish a story or photo of yours, we'll send you a complimentary copy of the issue in which it appears. There's no payment for use of text or photos in "Your View."

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Peter Nilsson, *Northern Hawk Owl* (detail), 2015,
watercolor on Arches paper



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ONLINE PHOTO OF THE WEEK CONTEST WINNER

May-June winner

Green Heron • by John Picken

Congratulations to John Picken of Chicago! He won our Photo of the Week Contest for May and June with this image of a Green Heron using a turtle as a steppingstone at Chicago's North Pond Nature Sanctuary, Hotspot Near You No. 15.

"The heron flew into one of its fishing spots and found it overrun with turtles," he told us. "At one point, its path along a sunken tree branch was blocked by a turtle. Undeterred, it just stepped onto and over the turtle. The turtle did not move except to pull its head into its shell."

Mac Stone, the author and photographer of our August issue's cover story about Prothonotary Warbler, was our judge.

"Images that stick in my mind always show something unique," Stone says. "I've seen countless Green Herons but have never seen one using a turtle as a steppingstone. Thanks for showing us this moment; it will be hard to forget."

Photo of the Week Contest

Complete rules and guidelines • www.BirdWatchingDaily.com

Modern family

Concealed by a blind, photographer gets up-close view of unusual group of ducklings



Wood Ducks and Hooded Merganser, Brick Pond Wetland Preserve, Owego, New York, June 6, 2015, 10:30 a.m., by Teri Franzen

Interspecific brood parasitism is not a phrase that rolls trippingly off the tongue, and the behavior is not something we get to see everyday. But egg dumping does happen, and subscriber Teri Franzen has proof. She was in a blind 20 feet from the shore of a pond this spring when a Wood Duck hen appeared with four fledglings — three of her own and one from a Hooded Merganser.

The blended family settled onto a log 20 yards away, allowing Franzen to try many compositions, including the one above. “What I like about this specific image, other than the really cute ducklings,” she says, “is that it illustrates the separation of the merganser from its adoptive siblings.” Why would a Hoodie lay eggs in a Wood Duck’s nest? The hen may have been unable to find a nest site of her own or a predator may have disturbed her nest. We can only guess.

Camera: Canon 7D Mark II

Lens: 500mm IS II with a 1.4x teleconverter

Settings: 1/3200, f/7.1, ISO 400, manual mode

Light: Natural

Format: JPG



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ALL IN: Subscriber Teri Franzen is a software engineer from Endicott, New York. A birder and bird photographer since 2012, she shares her images in both our online galleries and our Flickr group. We featured her portrait of a drake Wood Duck as a Photo of the Week in January 2015.

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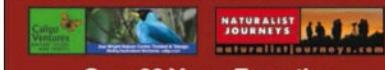
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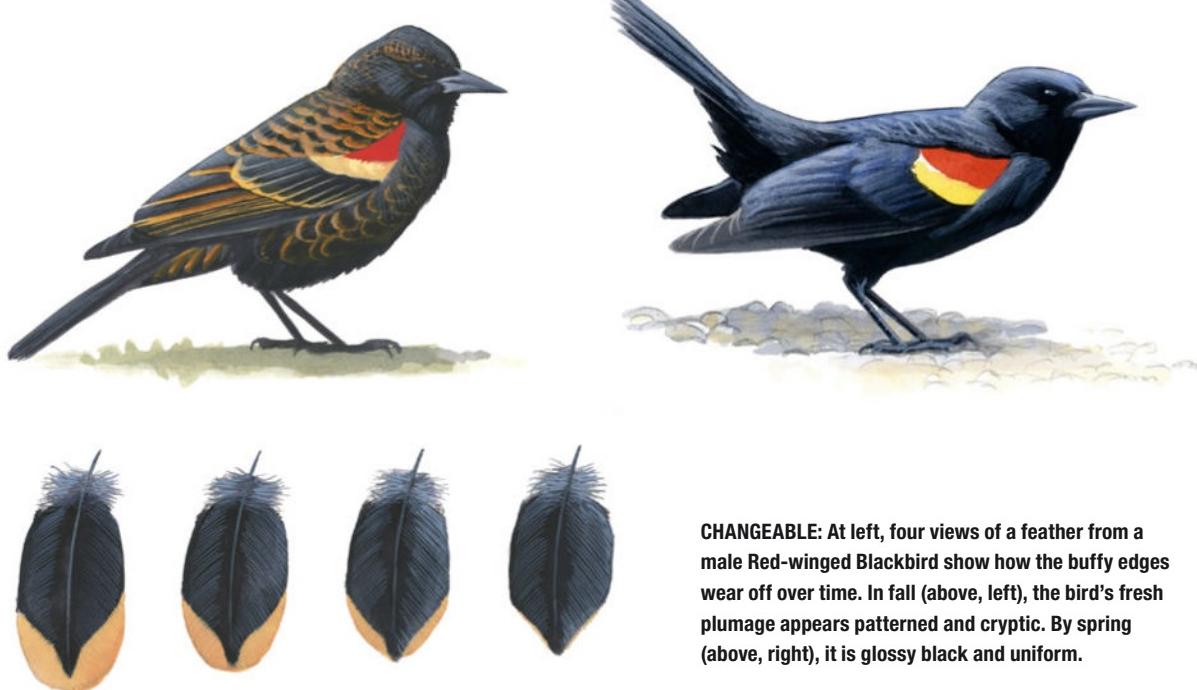
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CHANGEABLE: At left, four views of a feather from a male Red-winged Blackbird show how the buffy edges wear off over time. In fall (above, left), the bird's fresh plumage appears patterned and cryptic. By spring (above, right), it is glossy black and uniform.

Feather images from *The Sibley Guide to Bird Life & Behavior* (Alfred A. Knopf, 2001)

Changing color

How birds can alter their appearance without molting

Most of the dramatic seasonal changes in a bird's appearance are the result of molt — that is, the replacement of old feathers with new.

A male Scarlet Tanager replaces the drab greenish feathers of winter with intense red in spring, and then molts back to greenish in the fall. All birds molt at least once a year (usually in late summer), and many species, like Scarlet Tanager, add a second molt in late winter that gives rise to the bright colors we enjoy in spring.

The process of molt allows birds to change their appearance dramatically, but it is expensive. Growing a full new set of feathers takes a lot of energy and resources. Consequently, many species molt just once a year. But that doesn't mean they look the same year-round; they can take advantage of other means of changing their appearance.

"Feathers are dead structures, like hair."

Feathers are dead structures, like hair. From the moment they grow, they are subjected to sun, abrasion, and other wear and tear. The blackish pigment melanin, however, strengthens feathers, making the dark parts more resistant to wear. Birds use this fact to grow feathers that wear in specific ways.

For example, male Red-winged Blackbirds molt only in late summer, growing black feathers that have broad edges that are buff to rufous in hue. They give the fresh fall plumage a more cryptic color and pattern, and offer some protective cover to the black parts. Over the winter months, the paler brownish edges wear off, and by spring, the male's body plumage is a uniform glossy black.

This kind of color change can be seen in many bird species. The black throat patch of the male House Sparrow, for example, is covered by whitish feather edges in fall and revealed gradually during the winter.

The brilliant red of species like Northern Cardinal and House Finch is veiled by thin grayish edges in fresh plumage in the fall and early winter.

Enjoy the delicate shades and patterns of the fresh-plumaged birds of fall, and keep an eye on them for changes over the course of the winter. 

David Allen Sibley is the author of *The Sibley Guide to Birds, Second Edition*, *Sibley's Birding Basics*, and field guides to the birds of eastern and western North America. In our last issue, he told how to reconcile the different looks of folded and extended wings.

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EIGHT MORE Audubon ORIGINALS



"Early Birds," BirdWatching magazine, October 2015

Audubon began drawing birds long before he started work on *Birds of America*, the book that made him famous, yet only two collections of his youthful artwork survive. One, containing 114 drawings, is carefully preserved at Harvard's Houghton Library. We were granted special permission to reproduce our favorites in our October issue. We chose 18 pieces, 10 of which we printed in the magazine. Here, as a bonus for readers of our digital editions, are the remaining eight, including the young artist's poignant portrait of Passenger Pigeon.

Images courtesy Houghton Library,
Harvard University (MS Am 21)

Watch for bonus digital content
with our December 2015 issue,
available on October 19!



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Kilddeer
drius Vociferus
le Kildir de Buffon —



Alcion a' amique (petitiante) Buffon.
King Fisher.
Chat de L' Oise July 15. 1808.

Belted King Fisher ^{King}
Alcedo atthis

drawn by J. S. Audubon

Belted Kingfisher (July 1808)



Northern Shoveler (April 1807)



Killdeer (1811)

29



Chimney Swallow A. W.
Hirundo Pelasgia

N^o 214.
drawn by J. J. Audubon Monodelphus niger auct. (penn.) ad Buffon
located at L' Ohio July 27. 1808

Tangara In Mississip.

Summer Tanager on black locust
branch (June 1808)



Northern Pintail (February 1807)



Laud. Ann. May 1808, Spring bird book
and very numerous — see plate 222 pgs.
N° 105. N. O. Bird



L! Ohio. Aug 21st



Common Goldeneye with
two mussels (undated)

Les qui trouveront la position de traordinaire
et vont bien voir que malgr'e une telle exhalation
et moi souvent examine' chose aux dards et gross
eys en oblique il pousse un autre son
un nom here spoon bill teal. Edwards, p.
Chat de

12 pms à la
appelé le
P. A. A.
N° 109.

New York April 3, 1807 —

J. L. Audubon



Passenger Pigeon (December 1809)



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magazine

